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San Juan Basin Action Plan

RECREATION RESOURCES TECHNICAL REPORT

for the

Environmental Impact Statement on Public Service Company of New Mexico's Proposed New Mexico Generating Station and Possible New Town

United States
Department
of the Interior

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1982
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Bureau of Land Management
New Mexico State Office
Santa Fe, New Mexico

October 1982

Report 18 of 22

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
NEW MEXICO STATE OFFICE
P.O. BOX 1449
SANTA FE, NEW MEXICO 87501

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NM30840EIS
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October 1982

Dear Interested Citizen:

Attached is one of twenty-two technical reports developed as a basis for writing the Environmental Impact Statement on Public Service Company of New Mexico's Proposed New Mexico Generating Station and Possible New Town (NMGS EIS). (A list of the technical reports is attached.)

These technical reports provide detailed information on the existing environment, methods used for the impact analysis, and related data supportive of the analysis and conclusions presented in the EIS. These reports should be retained for use with the Draft and Final EIS and other documents related to BLM's San Juan Basin Action Plan (SJBAP).

The Draft NMGS EIS will be filed with the Environmental Protection Agency and released for public review on November 30, 1982. Comments on the Draft EIS will be due by close of business February 7, 1983, at the BLM New Mexico State Office. Because of the large volume of material presented in the technical reports, the BLM is distributing these reports in advance of the Draft EIS to provide sufficient time for public review. The technical reports will be available for public review at the places indicated on the attached list. Copies will also be available from the BLM New Mexico State Office, U.S. Post Office and Federal Building, Santa Fe, for a copy fee.

Informational public meetings are scheduled for December 1982 to provide a public forum to clarify questions and concerns about the SJBAP proposals and the related environmental documents, which will all have been issued by that time. The meetings are scheduled as follows:

- December 14, Civic Center, Farmington, 3 to 9 PM
- December 14, Convention Center, Albuquerque, 3 to 9 PM
- December 15, Chapter House, Crownpoint, 3 to 9 PM
- December 16, Holiday Inn, Gallup, 3 to 9 PM
- December 16, Kachina Lodge, Taos, 3 to 9 PM

In addition, formal public hearings will be held in January 1983 to solicit public comments on the SJBAP Proposals. These meetings are scheduled as follows:

- January 10, Chapter House, Crownpoint, beginning at 1:00 PM
- January 12, Civic Center, Farmington, beginning at 9:00 AM
- January 14 (and 15th if necessary because of the number of registrants), Four Seasons Motor Lodge, Albuquerque, I-40 and Carlisle Blvd., beginning at 9:00 AM (each day)

Questions on the public meetings, hearings, and the technical reports themselves should be directed to:

Leslie M. Cone
NMGS Project Manager
BLM, New Mexico State Office
P.O. Box 1449
Santa Fe, NM 87501
(505) 988-6184 FTS 476-6184

Sincerely yours,

Charles W. Luscher

Charles W. Luscher
State Director, New Mexico

List of Technical Reports

1. Purpose and Need
2. Project Description
3. Alternatives to the Project
4. Site Alternatives
5. Permit Reconnaissance
6. Air Quality
7. Geologic Setting
8. Mineral Resources
9. Paleontology
10. Soils, Prime and Unique Farmlands
11. Hydrology
12. Water Quality
13. Vegetation
14. Wildlife and Aquatic Biology
15. Threatened and Endangered Species
16. Cultural Resources
17. Visual Resources
18. Recreation Resources
19. Wilderness Values
20. Transportation
21. Social and Economic Conditions
22. Land Use Controls and Constraints

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Individual copies of the technical reports can be obtained for a copy fee. Inquiries should be directed to:

Bureau of Land Management, New Mexico State Office
Title Records and Public Assistance Section (943B)
U.S. Post Office and Federal Building
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Santa Fe, NM 87501
(505) 988-6107 FTS 476-6107

Copies of the reports are available for public review at the locations listed below. [Formal and informal cooperating agencies are denoted by an asterisk (*).]

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NMGS Project Staff (934A)
Room 122, Federal Building
Cathedral Place
P.O. Box 1449
Santa Fe, NM 87501
(505) 988-6184 FTS 476-6184

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Room 129, Federal Building
Cathedral Place
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Santa Fe, NM 87501
(505) 988-6226 FTS 476-6226

Public Affairs Staff (912)
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U.S. Post Office and Federal Building
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Farmington, NM 87401
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Carlsbad, NM 88220
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Santa Fe, NM 87503
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Bataan Memorial Building
Santa Fe, NM 87503
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OTHER ORGANIZATIONS

Public Service Company of New Mexico
Alvarado Square
P.O. Box 2268
Albuquerque, NM 87158
(505) 848-2700

Woodward-Clyde Consultants, Inc.
3 Embarcadero Center, Suite 700
San Francisco, California 94111
(415) 956-7070

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Aztec Public Library
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Crownpoint Community Library
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Crownpoint, NM 87313

Cuba Public Library
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Cuba, NM 87027

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Farmington, NM 87401

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Bureau of Indian Affairs*
Eastern Navajo Agency
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Crownpoint, NM 87313
(505) 786-5228

Bureau of Indian Affairs*
Navajo Area Office
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Window Rock, AZ 86515
(602) 871-5151 FTS 479-5314

Bureau of Reclamation*
Upper Colorado Regional Office
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Salt Lake City, UT 84147
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South Central Region
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Albuquerque, NM 87102
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Minerals Management Service*
Resource Evaluation Office
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Farmington, NM 87401
(505) 327-7397 FTS 572-6254

National Park Service*
Southwest Regional Office
1100 Old Santa Fe Trail
Santa Fe, NM 87501
(505) 988-6375 FTS 476-6375

National Park Service*
Environmental Coordination Office
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P.O. Box 728
Santa Fe, NM 87501
(505) 988-6681 FTS 476-6681

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Field Supervisor, Ecological Services
3530 Pan American Highway, Suite C
Albuquerque, NM 87107
(505) 766-3966 FTS 479-3966

U.S. Geological Survey (WRD)*
505 Marquette Avenue, Room 720
Albuquerque, NM 87101
(505) 766-2810 FTS 474-2817

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Region VI
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Dallas, TX 75270
(214) 767-2716 FTS 729-2716

Navajo Tribe*
c/o Division of Resources
P.O. Box 308
Window Rock, AZ 86515
(602) 871-6592

Pueblo of Zia*
General Delivery
San Ysidro, NM 87053
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Farmington, NM 87401

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RECREATION RESOURCES TECHNICAL REPORT

for the
Environmental Impact Statement on Public Service Company of New Mexico's Proposed New Mexico Generating Station and Possible New Town

Prepared by

Woodward-Clyde Consultants

for the

U.S. Department of the Interior
Bureau of Land Management

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NEW MEXICO GENERATING STATION

1.0

INTRODUCTION

BACKGROUND

Included in the recent Council on Environmental Quality Regulations (1979) are several important objectives to reduce excessive paperwork in the preparation of environmental impact statements (EISs):

- Discuss only briefly issues other than significant ones.
- Emphasize the portions of the EIS that are useful to decision makers and the public and reduce emphasis on background material.
- Prepare analytic rather than encyclopedic EISs.

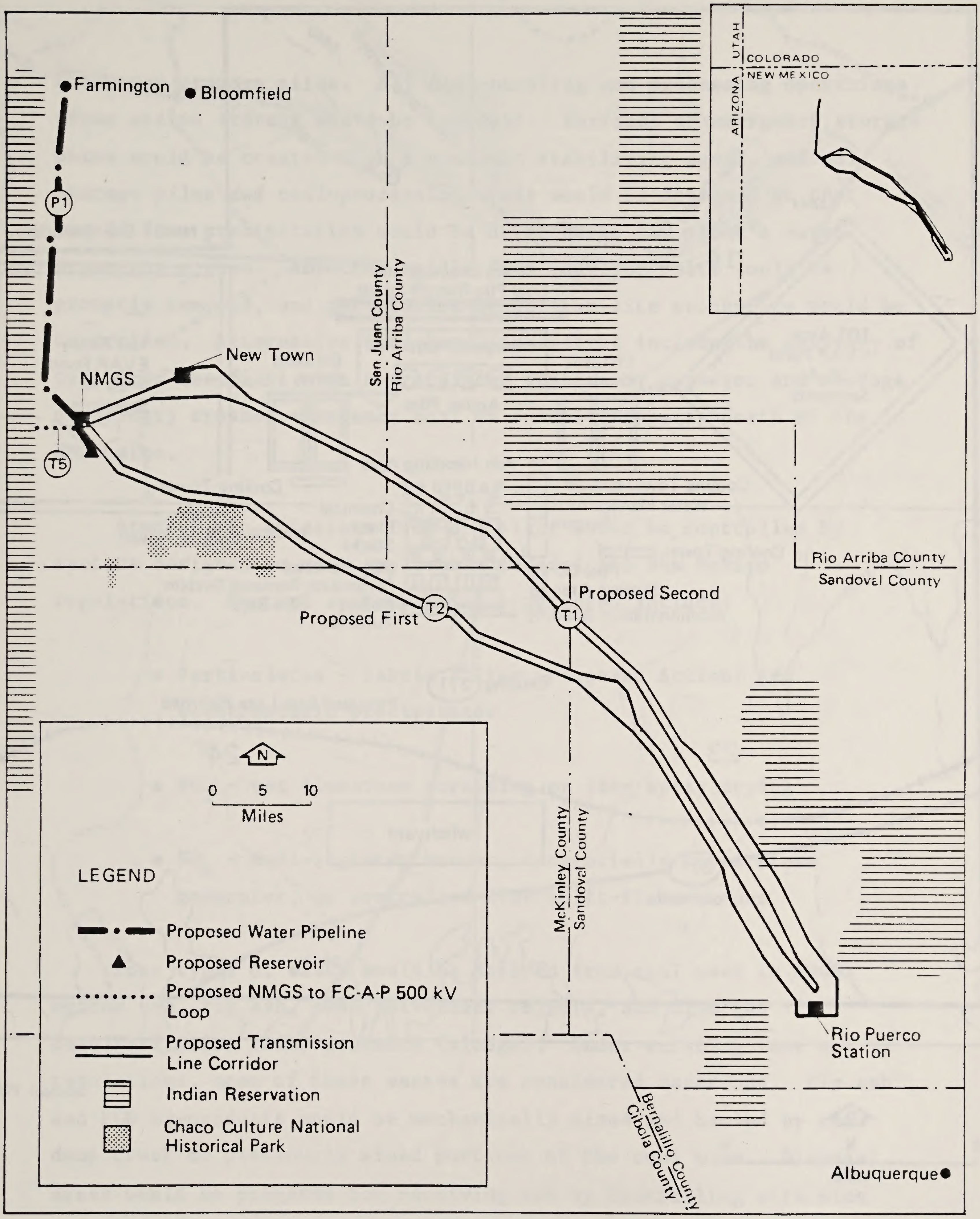
In order to accomplish these objectives and still provide the depth and background required for an analytic impact statement, this technical report has been prepared for the New Mexico Generating Station (NMGS) project. In this report, impacts that were not identified as significant but which are still considered important by the public or technical specialists are analyzed. Background material is provided for those issues and impacts that were considered necessary for the comparison of alternatives. Impacts that were not identified as significant or important by the public and by technical preparers are summarized, and reasons for their elimination from detailed analysis are discussed.

SUMMARY DESCRIPTION OF PROJECT COMPONENTS

Public Service Company of New Mexico (PNM) proposes to construct a 2000-megawatt (MW) coal-fired electric generation plant approximately 35 miles south of Farmington, New Mexico, in San Juan County (Map 1-1). The proposed NMGS, at ultimate development, would have four 500-MW generating units. Each generating unit would include a turbine generator area, coal pulverizer area, boiler area, particulate removal system, SO_2 removal system, and chimney stack. The proposed arrangement of these and other power plant components is shown in Figure 1-1. For the environmental analysis, it was assumed that commercial operation of the first 500-MW unit would begin in 1990 and that other units would start operating during the 1990s.

Coal for NMGS would be acquired through long-term contracts with Sunbelt Mining and Arch Minerals (Proposed Action) or other producers in the San Juan Basin (alternative coal supply). Coal acquired from a joint venture of Sunbelt and Arch Minerals would be supplied from surface mines (referred to as the Bisti mine in this analysis) in the immediate vicinity of the proposed plant site. Coal acquired from other producers in the San Juan Basin would be hauled from mines located as much as 30 miles from the proposed plant site. Coal required for NMGS would average 7.5 million tons per year, or a total of 300 million tons over the 40-year project life.

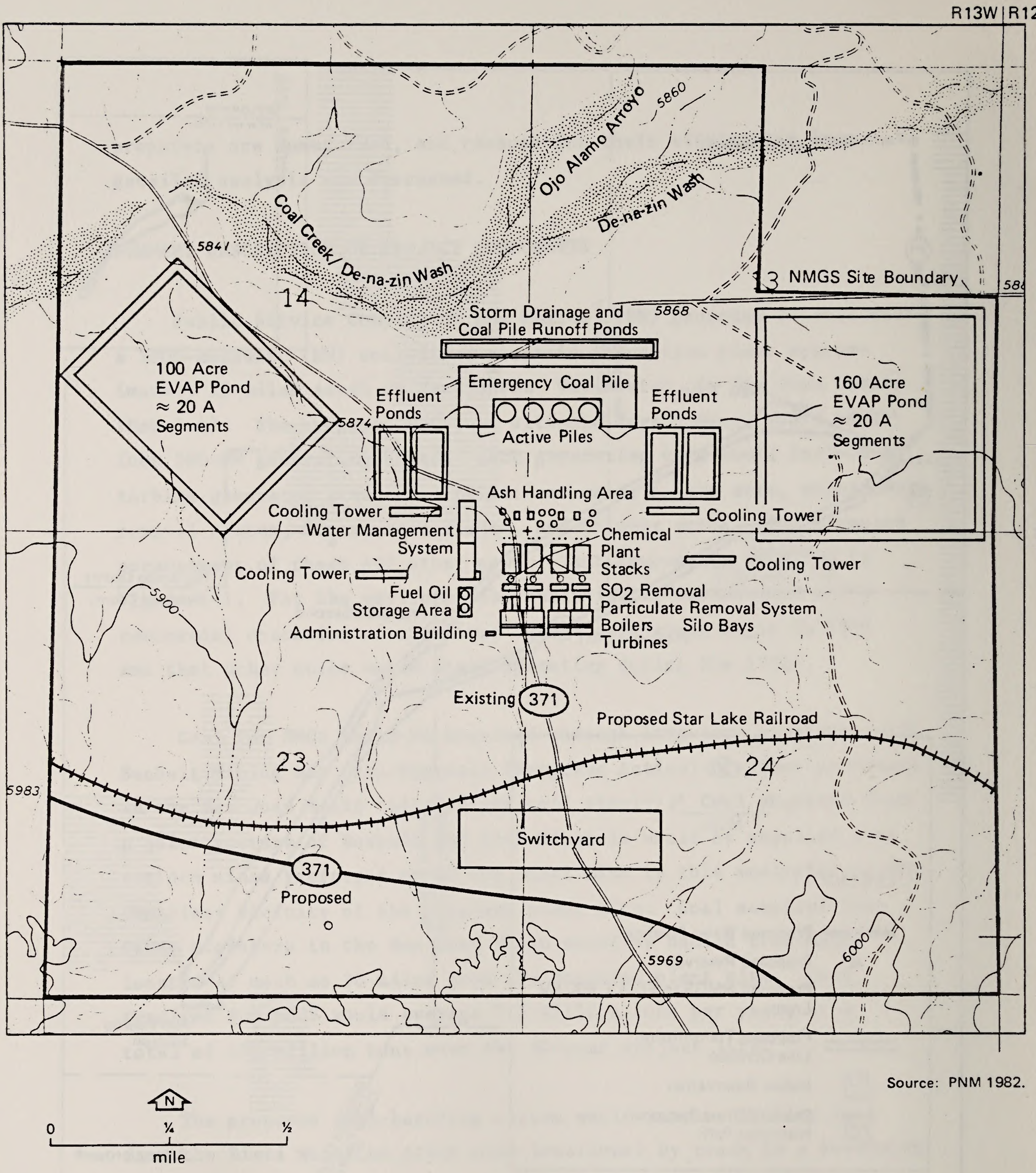
The proposed fuel-handling system would involve hauling coal from the Bisti mine (or other mine locations) by truck to a receiving facility located adjacent to the NMGS site. Coal would then be transferred via conveyor belt from the receiving station to active or



Note: For more information, see the location maps in Appendix G of the EIS.

Source: BLM 1982.

Map 1-1. GENERAL LOCATION OF PROPOSED ACTION



Source: PNM 1982.

Figure 1-1. STATION LAYOUT

emergency storage piles. All coal-handling and processing operations after active storage would be enclosed. Surfaces of emergency storage piles would be treated with a nontoxic stabilizing agent, and all storage piles and coal-processing areas would be designed so that runoff from precipitation would be diverted to the plant's water treatment system. Any coal spills from conveyor belts would be promptly removed, and percolation beneath on-site stockpiles would be controlled. Alternative fuel-handling systems include the delivery of coal from the Bisti mine to receiving station by conveyor and storage of primary crushed emergency coal on Sunbelt property north of the NMGS site.

Atmospheric emissions from the plant would be controlled by systems designed to meet applicable federal and New Mexico regulations. Control systems being considered include:

- Particulates - fabric filter (Proposed Action) and electrostatic precipitator
- SO_2 - wet limestone scrubbing or lime spray drying
- NO_x - dual-register burner, tangentially fired steam generator, or controlled-flow/split-flame burner

Four types of waste would be derived from coal used in NMGS: bottom ash, fly ash, coal pulverizer rejects, and flue gas desulfurization (FGD) products (sludge). Under existing laws and regulations, none of these wastes are considered hazardous. Fly ash and FGD by-products would be mechanically mixed and hauled by end-dump truck to previously mined portions of the coal mine. Disposal areas would be prepared for receiving ash by backfilling with mine overburden. Ash would then be dumped and spread in layers over the mine overburden. After the ash was placed and spread, it would be covered with layers of overburden and surface soil or topsoil and then a vegetative cover would be established. Bottom ash and pulverizer rejects would be collected for disposal in dewatering bins and then hauled by end-dump trucks for disposal into previously mined portions of the coal mine. Procedures for disposal would be the same as for fly ash.

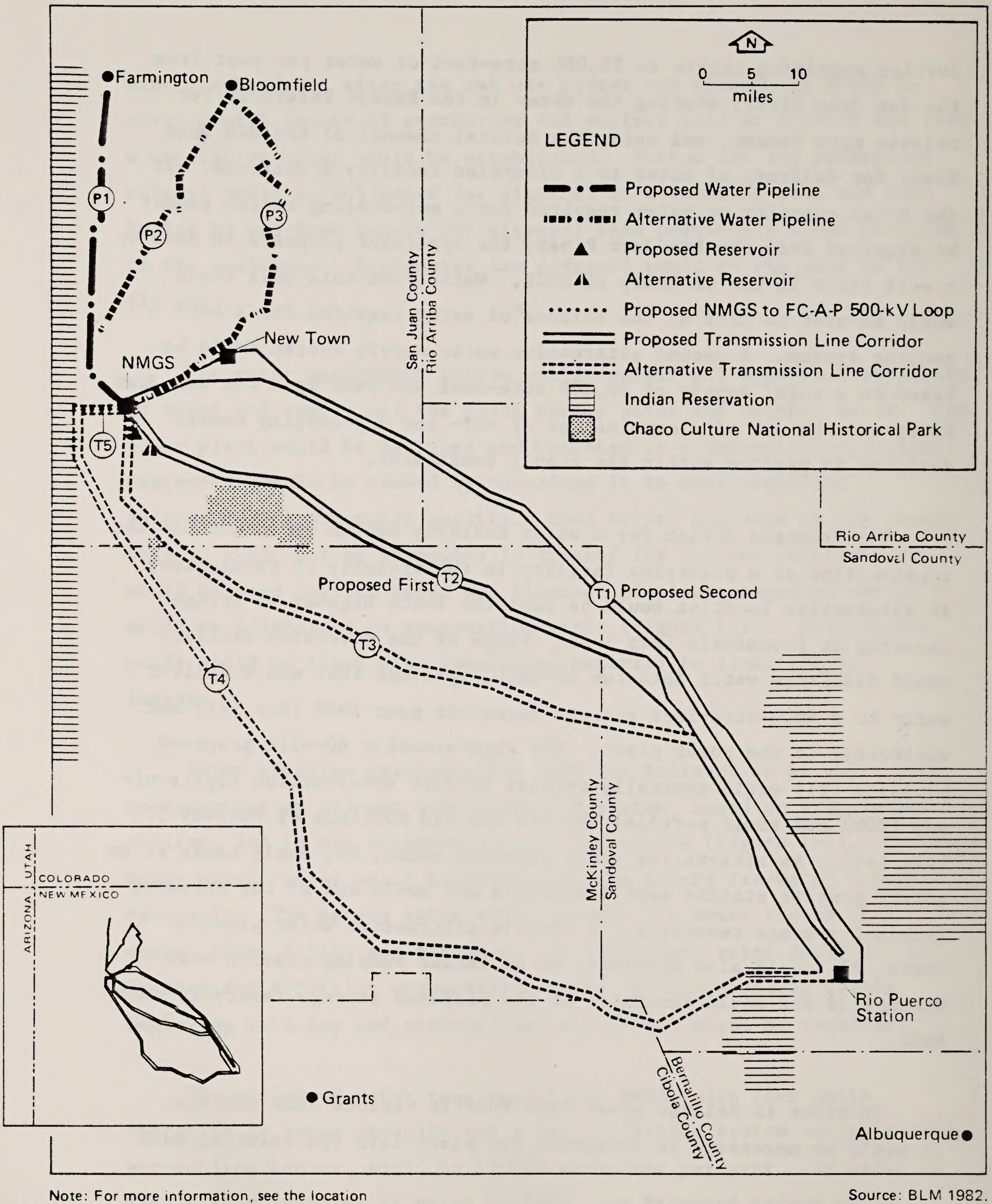
The water management system would contain all equipment necessary to treat and supply all the plant makeup water and potable water. The power plant would be designed and operated as a zero-discharge plant; wastewater would be reused by cascading it to uses requiring successively lower water quality. Used water, degraded to the extent that it could not be economically treated for further in-plant use, would be used for transport and disposal of plant-generated wastes or would be discharged to evaporation ponds (Figure 1-1). Evaporation ponds would be lined with impervious material to limit seepage losses.

Water supplies available for NMGS are believed to be sufficient to construct an all-wet heat-rejection system, based on evaporative cooling, and to use forced-draft cooling towers (Figure 1-1). Cooling-tower makeup water would be drawn from the nearby raw-water storage reservoir. The makeup water would replace the tower losses from evaporation, drift, and blowdown. If sufficient water could not be secured for a totally evaporative system, a water-cooling system employing both dry and conventional wet towers might be required.

The estimated water requirement for NMGS, with four units operating at rated capacity and a heat-rejection system equipped with wet-cooling towers, would be 35,000 acre-feet per year. In order to supply this quantity of water to NMGS, the Proposed Action would involve acquiring rights to 35,000 acre-feet of water per year from the San Juan River, storing the water in the Navajo Reservoir for release upon demand, and using the natural channel of the San Juan River for delivery of water to a diversion facility downstream. If the total quantity of water required for a wet-cooling system cannot be acquired from the San Juan River, the applicant proposes to develop a well field in the vicinity of NMGS. Water from this well field would be used to make up the balance of water required for a wet-cooling system. A second alternative water supply system would be based on a total supply of 20,000 acre-feet per year from the San Juan River and the use of a combination of wet- and dry-cooling towers designed to perform within the supply constraint.

The Proposed Action for a water delivery system would include the construction of a diversion facility in the vicinity of Farmington; an alternative location would be near the State Highway 44 bridge crossing at Bloomfield (Map 1-2). Pumps at the diversion facility would discharge water into two 36-inch pipelines that would deliver water to a 4000-acre-foot storage reservoir near NMGS (Map 1-1) and ultimately to the power plant. The approximately 40-mile proposed pipeline (P1) would generally require 90-foot construction rights-of-way (ROW) and would parallel the new and old portions of Highway 371 (Map 1-1). An alternative water pipeline route, P2, would begin at an intake pumping station near Bloomfield and would end at the proposed terminal storage reservoir. A 49-mile alternative water pipeline route, P3, would also originate at an intake pumping station near Bloomfield and would terminate at the proposed storage reservoir near NMGS.

In order to deliver power from NMGS to various load centers, it would be necessary to integrate the plant into the existing bulk



Note: For more information, see the location maps in Appendix G of the EIS.

Source: BLM 1982.

Map 1-2. GENERAL LOCATION OF ALTERNATIVES INCLUDING THE PROPOSED ACTION transmission systems of PNM and neighboring utilities. Thus the proposed transmission system would consist of a 500-kilovolt (kV) loop linking NMGS with PNM's approved 500-kV Four Corners-Ambrosia-Pajarito (FC-A-P) line, located approximately 5 miles west of NMGS, and two 500-kV lines linking NMGS with the Albuquerque distribution and load center at the proposed Rio Puerco Station (Map 1-1). The NMGS-Albuquerque system would be installed in phases: the 500-kV loop in 1990 with commencement of commercial operation of Unit 1, the first 500-kV line with Unit 2 in 1993, and the second 500-kV line with Unit 4 in 1998.

Four routes are considered technically and economically feasible for construction of the 500-kV transmission system. Route T2 is proposed for the first 500-kV line and route T1 is proposed for the second 500-kV line; routes T3 and T4 are alternatives to the Proposed Action. The total distance traversed would be similar for the two proposed and two alternative corridors: 101 miles (T2), 107 miles (T1), 105 miles (T3), and 126 miles (T4). With the exception of tower sites, the proposed 200-foot ROW could support other compatible land uses, such as grazing. PNM would keep the transmission line ROW closed and would patrol the line by helicopter each month. Lands disturbed by heavy equipment and temporary access roads would be restored to their original condition.

Table 1-1 displays construction work force estimates over time. Construction employment for station facilities would reach peaks of 1515 employees in 1987 and 1530 employees in 1992. Operations employment at station facilities would increase steadily, from 30 employees in 1989 to 900 employees in 1999 when all four units are expected to be on-line.

Table 1-1. NMGS CONSTRUCTION AND OPERATION EMPLOYMENT

			NMGS											
			Construction					Operation						
Year	Intake Pipeline and Reservoir	500-kV Transmission Line	Unit 1	Unit 2	Unit 3	Unit 4	Total	Unit 1	Unit 2	Unit 3	Unit 4	Total	Total Employment	Annual Change
1985	—	—	85	—	—	—	85	—	—	—	—	—	85	+85
1986	—	—	800	—	—	—	800	—	—	—	—	—	800	+715
1987	115	—	1515	—	—	—	1630	—	—	—	—	—	1630	+830
1988	295	104	1180	30	—	—	1505	—	—	—	—	—	1505	-125
1989	—	—	360	450	—	—	914	30	—	—	—	30	944	-560
1990	—	—	100	940	40	—	1080	200	—	—	—	200	1280	+336
1991	—	—	—	750	570	—	1320	250	—	—	—	250	1570	+290
1992	—	—	—	270	1260	—	1530	250	24	—	—	274	1804	+234
1993	—	—	—	105	955	30	1090	250	160	—	—	410	1500	-304
1994	—	78	—	—	325	435	838	250	200	30	—	480	1318	-182
1995	—	—	—	—	90	940	1030	250	200	200	—	650	1680	+362
1996	—	—	—	—	—	775	775	250	200	250	—	700	1475	-205
1997	—	—	—	—	—	255	255	250	200	250	24	724	979	-496
1998	—	—	—	—	—	95	95	250	200	250	160	860	955	-24
1999	—	—	—	—	—	—	0	250	200	250	200	900	900	-55

Source: PNM 1980, unpublished data.

According to PNM (unpublished data, 1980), estimated construction employment skill requirements would be as follows:

Skill	Percent of Total Construction Work Force
Boilermakers	9.4
Pipefitters	14.2
Electricians	14.4
Carpenters	5.6
Ironworkers	10.0
Operators	10.0
Laborers	9.0
Teamsters	4.1
Cement masons	0.8
Millwrights	3.3
Insulators	4.0
Sheetmetal workers	1.1
Painters	1.2
Others	0.5
Supervision	12.4

The above estimates are averaged for construction of all four units.

SAN JUAN BASIN ACTION PLAN OVERVIEW AND RELATIONSHIP OF THE NMGS EIS TO ACTIONS INCLUDED IN THE PLAN

The proposed site for the NMGS is located in the San Juan Basin of northwestern New Mexico. The Bureau of Land Management (BLM) is responsible for the management of much of the land and mineral resources in this area, and currently has six separate but interrelated proposals under consideration within the basin. In order to respond to these, the BLM has developed a San Juan Basin Action Plan (SJBAP). This plan provides for the organizational arrangements whereby the environmental analyses and decision making can be implemented in a timely and efficient manner. The plan describes the process for preparation of three site-specific EISs (including the NMGS EIS) and three Environmental Assessments (EAs):

- Coal Preference Right Lease Applications (EA)
- San Juan River Regional Coal Leasing (EIS)
- Wilderness Study Areas (WSAs) (EIS)
- New Mexico Generating Station (EIS)
- Ute Mountain Land Exchange (EA)
- Bisti Coal Lease Exchange (EA)

In addition to these documents, the action plan provides for the preparation of a Cumulative Overview (CO). The CO is intended to focus on the cumulative impacts that would result from the proposed actions analyzed in the EISs and EAs listed above and therefore to facilitate public review and decision making. As a result of this organization, the impact analysis in the NMGS EIS and technical background reports concentrates on the impacts expected to result from the specific NMGS components proposed. The cumulative impacts expected to result from the proposed NMGS, in addition to the cumulative impacts of other proposals to be developed in the same time period, are described in the CO.

BASELINE CONDITIONS ASSUMED FOR THE NMGS TECHNICAL REPORT IMPACT ANALYSES

The site-specific impact analysis for this technical report was based on the affected environment and available resources that would be existing at the time of construction and operation of the NMGS facility. Since construction at the NMGS facility would not begin until 1985, certain assumptions regarding project development in the San Juan Basin were necessary. Two levels of project development were considered, along with criteria for each, in developing a status for the various non-SJBAP actions proposed for the San Juan Basin area.

- Baseline 1 - The projects considered in this level of development are those that have approval and are to be built or under construction in 1985. This level represents the projected existing environment without the proposals included in the SJBAP.
- Baseline 2 - The projects considered in this level are in some phase of the application stage. In this level, Baseline 1 projects are added to any projects in Baseline 2 along with any revision in resource production or uses (e.g., coal).

Where differences in Baselines 1 and 2 affect the results of impact analyses, discussion is provided. If no differences are identified, it should be assumed that consideration of the two different baselines did not alter the impact analyses.

A complete list of projects and comprehensive location maps for Baselines 1 and 2 are provided in Appendix C of the NMGS EIS.

ORGANIZATION OF THE REPORT

Section 2.0 of this technical report describes the assumptions and methodological approach used in the assessment of potential impacts of the Proposed Action on the affected environment. In addition, Section 2.0 contains a definition of the study area and identification of data sources.

Section 3.0, Affected Environment, contains baseline data on existing conditions in the study area, as well as projections of future conditions without the Proposed Action. Information on historical trends is presented where it is useful in providing a basis for predicting most likely future trends. The description of projected future trends takes into consideration the changes in the environment that are expected to occur as a result of the projects identified in Baseline 1. This provides a reasonable estimate of the future existing environment against which the potential impacts of the Proposed Action and alternatives can be assessed.

Section 4.0 describes the potential effects of implementing the Proposed Action and alternatives. Impacts identified are measured against indicators of significance in order to estimate the importance of the impact to the affected human environment. (Potential impacts associated with alternatives to the Proposed Action are compared in Section 9.0.)

In Section 5.0, mitigation measures are suggested. These measures would help to alleviate the potentially significant adverse impacts or enhance the beneficial impacts identified in the Section 4.0 analysis. Those potentially adverse impacts for which no appropriate mitigation measures have been suggested are discussed in Section 6.0 as "unavoidable adverse impacts."

2.0

FRAMEWORK FOR ANALYSIS

GEOGRAPHIC AREA OF INFLUENCE

Nonurban recreation resources include the managed areas and dispersed use areas that could be directly or indirectly affected by the construction, operation, maintenance, or abandonment phases of the NMGS project components or alternatives. By definition, this includes recreation lands actually traversed by the project, and those areas where project activities (such as construction noise, dust, and odor) might be noticeable enough to affect the quality of the recreation experience at nearby recreation sites. Included in this recreation inventory are recreation use areas within a 100-mile radius, or one-day's travel distance, from the cities of Farmington, Aztec, and Bloomfield in San Juan County, where the project labor force is likely to reside and where increased visitor use could affect conditions at recreation resources.

Recreation resources include federal, state, and county parks, trails, and waterways where the following types of recreational activities take place: sightseeing, hunting, fishing, winter sports, float-boating, swimming, camping, picnicking, off-road vehicle (ORV) operation, hiking, and so on. Because this general region is primarily semiarid, the unique qualities of water are stressed to include all recreational rivers, streams, and reservoirs in the region of influence.

According to the State Comprehensive Outdoor Recreation Plan (SCORP) for New Mexico (State Planning Office 1976), the cities of Farmington, Aztec, and Bloomfield are in State Recreation Planning District 1, as are the proposed plant site, water pipelines, reservoir, and transmission lines. The proposed transmission lines also extend into Planning District 3. Because it is anticipated that the majority of employees would live in San Juan County, the inventory focuses on recreation resources available in Planning District 1, but also extends as far as a 100-mile radius from the three major places of residence.

INDICATORS OF SIGNIFICANCE

Critical factors in the determination of significance include the direct and indirect effects on the recreation resources (use of land and water, and disturbance to vegetation, habitat, or outstanding landscape characteristics); and changes to the quality of the recreation experience (such as from increased noise, reduced visibility, odor, or from increased activity demand and subsequent overcrowding of facilities).

Significant recreation impacts were determined according to the nature of the impact, the magnitude of change, and the duration of change. Short-term consequences, lasting less than two visitor seasons, are generally considered insignificant.

3.0

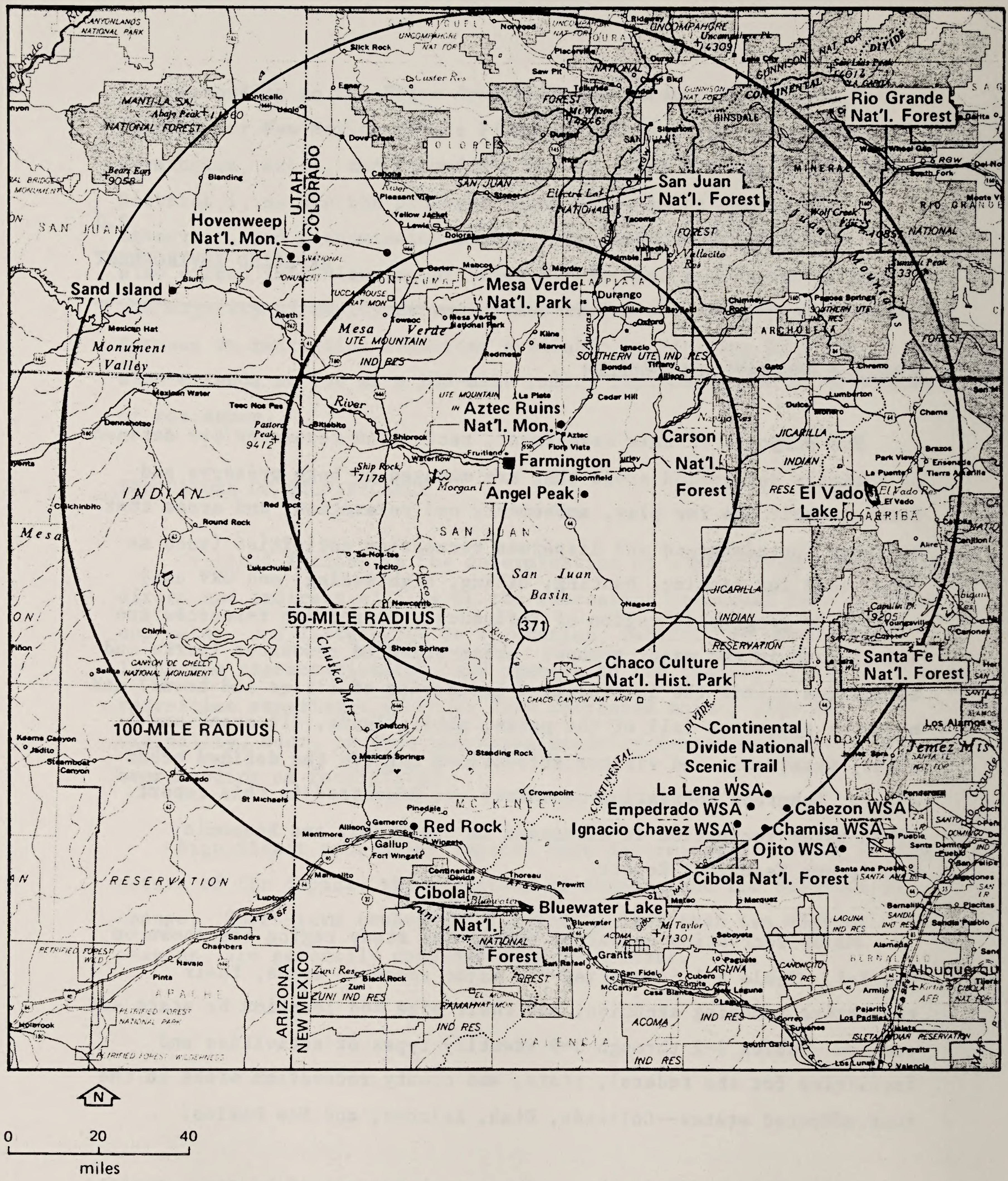
AFFECTED ENVIRONMENT

NONURBAN RECREATION RESOURCES

For purposes of this assessment, recreation resources are defined as formally designated areas that are managed to both preserve and further their use for play, amusement, and relaxation, and areas that are used for unmanaged and dispersed recreation activities (such as sites used for fishing, hunting, hiking, sightseeing, and ORV use) within the geographic region of influence. Recreation resources are categorized in two major groups: urban-oriented resources (parks and facilities within the incorporated boundaries of cities and towns) and nonurban resources (all of the parks, public lands, dispersed use areas, waterways, and visitor attractions outside the defined urban area). Nonurban recreation resources are discussed in this report. Urban-based recreation is discussed in the Social and Economic Conditions Technical Report.

Major recreation resources within the study region are shown on Map 3-1. Table 3-1 identifies the major resource areas, their respective managing agencies, and their size and location by state and county. Tables 3-2 through 3-9 identify types of activities and facilities for the federal, state, and county recreation areas in the four affected states--Colorado, Utah, Arizona, and New Mexico.

The public lands in the region are characterized by open expanses



Map 3-1. REGIONAL RECREATION AREAS

Table 3-1. INVENTORY OF NONURBAN RECREATION RESOURCES WITHIN THE GEOGRAPHIC REGION OF INFLUENCE

Resource	Managing Agency	State	County
Santa Fe National Forest	U.S. Forest Service	New Mexico	Rio Arriba, Sandoval
Carson National Forest	U.S. Forest Service	New Mexico	Rio Arriba
Cibola National Forest	U.S. Forest Service	New Mexico	McKinley, Valencia
Angel Peak	BLM	New Mexico	San Juan
Grand Gulch Primitive Area	BLM	Utah	San Juan
Sand Island, San Juan River	BLM	Utah	San Juan
Animas River	BLM	Colorado	La Plata
Chaco Culture National Historical Park	Nat'l Park Service	New Mexico	San Juan, McKinley
Mesa Verde National Park	Nat'l Park Service	Colorado	Montezuma
Aztec Ruins National Monument	Nat'l Park Service	New Mexico	San Juan
Glen Canyon Nat'l Recreation Area	Nat'l Park Service	Utah	Park, San Juan, Kane, Garfield
Hovenweep National Monument	Nat'l Park Service	Utah	San Juan
Bluewater Lake State Park	NM Parks & Rec.	New Mexico	McKinley
El Vado Lake State Park	NM Parks & Rec.	New Mexico	Rio Arriba
Heron Lake State Park	NM Parks & Rec.	New Mexico	Rio Arriba
Navajo Lake State Park	NM Parks & Rec.	New Mexico	San Juan

Table 3-1. INVENTORY OF NONURBAN RECREATION RESOURCES WITHIN THE GEOGRAPHIC REGION OF INFLUENCE (continued)

Resource	Managing Agency	State	County
Sims Mesa State Park	NM Parks & Rec.	New Mexico	Rio Arriba
Jemez State Monument	NM Parks & Rec.	New Mexico	Sandoval
Salmon Ruin	San Juan County	New Mexico	San Juan
Nabor Ranch	NM Game & Fish	New Mexico	San Juan
Jackson Lake	NM Game & Fish	New Mexico	San Juan
Miller Mesa	NM Game & Fish	New Mexico	San Juan
Stone Lake	Tribal (Apache)	New Mexico	Rio Arriba
Dulce Lake	Tribal (Apache)	New Mexico	Rio Arriba
Mundo Lake	Tribal (Apache)	New Mexico	Rio Arriba
Enbom Lake	Tribal (Apache)	New Mexico	Rio Arriba
Asaayi	Tribal (Navajo)	New Mexico	McKinley
Washington Pass	Tribal (Navajo)	New Mexico	San Juan
Captain Tom Lake	Tribal (Navajo)	New Mexico	San Juan
Chuska Lake	Tribal (Navajo)	New Mexico	McKinley
Morgan Lake	Tribal (Navajo)	New Mexico	San Juan
San Juan River	Tribal (Navajo)	New Mexico	San Juan
Blue Mountain Ski Area	Private (in Nat'l Forest)	Utah	San Juan
Purgatory Ski Area	Private (in Nat'l Forest)	Colorado	Montezuma
Stoner Ski Area	Private (in Nat'l Forest	Colorado	Montezuma
Hesperus Ski Area	Private	Colorado	Montezuma

Table 3-1. INVENTORY OF NONURBAN RECREATION RESOURCES WITHIN THE GEOGRAPHIC REGION OF INFLUENCE (concluded)

Resource	Managing Agency	State	County
San Juan River Fishing Easement	NM Game & Fish	New Mexico	San Juan
Navajo Dam Land and Wildlife Management Area	NM Game & Fish	New Mexico	San Juan
McGaffey Lake	U.S. Forest Service, NM Game & Fish	New Mexico	McKinley
Red Rock	City of Gallup, NM Parks & Rec.	New Mexico	McKinley

Note: Portions of the San Juan, Rio Chama, and Animas rivers not listed above also offer general (unmanaged) recreation resources.

Table 3-2. BLM RECREATION AREAS

Facilities	Angel Peak	Sand Island
Picnicking (family units)	16	6
Campsites	16	6
Camping Trailer Facilities	x	x
Restrooms	4	x
Float-Boating	_	x
Boat Launching	_	x

Sources: New Mexico Outdoors Map; New Mexico SCORP;
Southeastern Utah Multipurpose Map 1.

Key: x = facility/activity available
- = facility/activity not available

Table 3-3. CARSON NATIONAL FOREST AND CIBOLA NATIONAL FOREST RECREATION SITES (WITHIN STUDY AREA)

	Carson National Forest								Cibola National Forest				
Facilities	Los Pinos	Lagu-nitas	Hopewell Lake	El Pito	Canjelon Creek	Canjelon Lakes	Trout Lake	Echo Amphi-theater	Canyon Lobo	Coal Mine	Ojo Redondo	Quaking Aspen	McGaffey
Camping	x	x	x	x	x	x	x	x	x	x	x	x	x
Picnicking	x	x	x	x	x	x	x	x	x	x	x	x	x
Camping Trailer Facilities	-	-	-	-	-	x	-	-	-	x	x	x	x
Drinking Water	-	x	-	-	-	x	-	x	-	x	-	x	x
Number of Family Units	4	12	6	7	4	36	5	10	9	21	20	20	49
Stay Limit (days)	14	14	14	14	14	14	14	14	14	14	14	14	14
Fishing	x	x	x	x	x	x	x	-	-	-	-	-	x
Boating	-	-	x	-	-	x	-	-	-	-	-	-	-

Sources: Cibola National Forest, Mt. Taylor Ranger District Map, Carson National Forest Map.

Key: x = facility/activity available
- = facility/activity not available

Table 3-4. NATIONAL FOREST RECREATION AREAS (WESTERN HALF)

Facilities	Battleship Rock	La Cueva	Redondo	San Antonio	Horseshoe Springs	Rio Las Vacas	Clear Creek	Rio Puerco	Jemez Falls	Las Conchas	Paliza	Fenton Lake	Calaveras	Paliza Group	Indian Head	Dark Canyon	Seven Springs
Camping	-	-	x	x	x	x	x	x	x	-	x	x	x	x	-	-	x
Number of Family Units	37	7	59	36	3	5	5	5	10	8	20	15	4	25	4	2	7
Picnicking	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Stay Limit (Days)	-	-	14	14	14	14	14	14	14	14	14	-	-	-	-	-	14
Camping Trailer Facilities	-	-	x	x	-	x	x	-	x	-	x	x	x	-	-	-	x
Drinking Water	-	-	x	x	x	-	-	-	-	-	x	-	-	x	-	-	x
Fishing	x	x	x	x	-	x	x	x	x	x	x	x	x	-	x	x	x

Source: Santa Fe National Forest Map.

Key:
x = facility/activity available
- = facility/activity not available

Table 3-5. NATIONAL PARK SERVICE HISTORIC SITES

Facilities	Chaco Culture National Historical Park	Aztec Ruins	Mesa Verde National Park	Hovenweep
Campsites	35	–	477	31
Picnic Sites	35	5	477	x
Drinking Water	x	x	x	x
Restrooms	4	2	x	x
Guided Tours	–	–	x	–
Visitor Center	x	x	x	–
Archaeological Sites	x	x	x	x
Trails	x	x	x	x

Sources: Chaco brochure; Aztec Ruins brochure; Mesa Verde brochure; Southeastern Utah Multipurpose Map 1.

Key:
x = facility/activity available
– = facility/activity not available

Table 3-6. GLEN CANYON NATIONAL RECREATION AREA

Facilities	Hall's Crossing	Bullfrog	Hite	Wahweap*
Campsites (stay limit)	65 (30 days)	86 (30 days)	6 (30 days)	n/a n/a
Picnicking	x	x	x	x
Drinking Water	x	x	x	x
Boat Launching	x	x	x	x
Motorboating	x	x	x	x
Float-Boating	x	x	x	x
Boat Rental	x	x	x	x
Fishing	x	x	x	x
Swimming	x	x	x	x
Waterskiing	x	x	x	x

Source: Southeastern Utah Multipurpose Map 1.

Key:
x = facility/activity available
n/a = facility/activity not available

*Wahweap is located in Arizona.

Table 3-7. NEW MEXICO STATE PARKS

Facilities	Navajo Lake (Pines)	Sims Mesa	Bluewater Lake	El Vado Lake	Heron Lake	Red Rock
Picnic Sites	27	65	30	x	x	x
Campsites	80	65	100*	x	x	140
Shelters	x	10	x	x	-	x
Toilets	x	x	x	x	x	x
Drinking Water	x	x	x	x	x	x
Electricity	x	x	x	x	-	x
Showers	x	-	x	-	-	x
Dump Station	x	-	-	-	-	x
Boating	x	x	x	x	x	-
Boat Rental	x	-	x	-	-	-
Fishing	x	x	x	x	x	-
Waterskiing	x	x	x	x	-	-
Swimming Beach	-	x	x	x	-	-
Hiking Trails	x	x	x	x	x	x
Winter Sports	x	x	x	x	-	-
Hotel/Lodge	-	-	-	x	-	-
Land Area (acres)	18,459	500	2105	1728	4107	640
Water Area (acres)	13,251	n/a	2350	3220	5905	-

Sources: New Mexico SCORP 1976; New Mexico Outdoors Map.

Key:
x = facility/activity available
- = facility/activity not available
n/a = information not available

*There are no hookups available at these sites.

Table 3-8. NAVAJO TRIBE PARKS AND RECREATION DEPARTMENT REST AREAS AND CAMPING FACILITIES IN NEW MEXICO

Facilities	Asaayi[a] Lake	Berland Lake	Captain Tom Reservoir	Cutter Dam	4-Corners Monument	Mariano Lake	Morgan Lake[b]	Owl Springs	Red Lake	Red Rock Junction (Rest Area)	Community Park	Squirrel Springs	Todacheene Lake	Tunnel Springs (Rest Area)	Washington Pass	West Mexican Springs	Chuska Lake	San Juan River
Picnic Sites	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-
Tables	60	3	-	10	10	-	8	2	-	2	7	5	3	1	12	2	-	-
Campsites	x	x	x	x	-	x	x	-	x	-	x	-	x	-	x	x	x	-
Drinking Water	x	-	-	-	-	x	-	-	x	-	x	x	-	-	-	-	n/a	-
Toilets	3	2	-	-	10	-	3	1	-	-	2	1	1	-	1	2	n/a	-
Fireplaces	-	-	-	-	10	-	5	2	-	2	7	3	2	-	1	1	n/a	-
Fishing	x	x	x	x	-	x	x	-	x	-	-	-	x	-	-	-	x	x
Motorboating	-	-	-	-	-	-	x	-	x	-	-	-	-	-	-	-	x	-
Float-Boating	x	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	x

Sources: New Mexico Outdoors Map, New Mexico Department of Development, Tourist Division;
New Mexico SCORP 1976

Key:
x = facility/activity available
- = facility/activity not available
n/a = information not available

Note: Although developed campsites and picnic areas are not available at most Navajo recreation areas, both camping and picnicking are permitted.

[a] Asaayi Lake also has swimming.

[b] Waterskiing is available at Morgan Lake.

Table 3-9. JICARILLA APACHE TRIBE RECREATION SITES

Facilities	Stone Lake	Dulce Lake	Mundo Lake	Enbom Lake
Campsites	x	x	x	x
Picnic Sites	x	x	x	x
Toilets	x	x	x	x
Fishing	x	x	x	x
Season of Use	All year	All year	All year	All year
Lodge	x	-	-	-
Hookups	x	-	-	-

Sources: New Mexico Outdoors Map; Road Map of New Mexico.

Key: x = facility/activity available
- = facility/activity not available

of semiarid country surrounded by forested mountains. These mountains are suited to many recreation activities. The general study region has not been an area of high recreation use. Several factors contribute to the low use figures. A relatively small area population, poor roads, general lack of surface water, few publicized recreation attractions, prohibitive land ownership patterns, lack of tourist services, and poor access to gasoline have discouraged utilization of the area's recreation potential. Table 3-10 summarizes the recreation facilities in northwestern New Mexico.

ADMINISTRATING AGENCIES

Managed recreation facilities within and adjacent to the region are provided by federal, state, and county governments; Indian tribes; local communities; and private organizations. Federal recreation areas are oriented primarily toward managing large parcels of public lands and nationally significant resources such as archaeological sites, and areas for sightseeing, hiking, camping, and picnicking. Most of the state recreation resources within the region are water-related and provide for activities such as powerboating, waterskiing, swimming, and fishing. The Native American (tribal) resources are oriented toward camping, picnicking, and fishing. County recreation resources include archaeological sites. Some of the major developed recreation sites within the study region are Chaco Culture National Historical Park, Aztec National Monument, Salmon Ruins, Mesa Verde National Park, Glen Canyon National Recreation Area, Bluewater Lake, and Navajo Reservoir. Among the most popular undeveloped attractions are the scenic Bisti Badlands, De-na-zin Wilderness Study Area (WSA), and Chaco Mesa.

Bureau of Land Management

There are nine BLM WSAs within the study region. These areas are discussed in detail in the Wilderness Values Technical Report, but

Table 3-10. STATE DEPARTMENT OF RECREATION SUMMARY OF NONURBAN RECREATION FACILITIES IN NORTHWESTERN NEW MEXICO

	County		
	McKinley (District 1)	San Juan (District 2)	Sandoval (District 3)
Acres Devoted to Recreation	6258	90,685	52,914
Recreation Acres Publicly Owned	1223	44,454	37,083
Camping Facilities			
Developed Camping Sites	67	95	96
Acres for Primitive Camping	452	3	1,586
Snowskiing Slopes	0	0	0
Designated Hunting Areas (acres)			
Waterfowl	450	175	25
Upland Game	0	8,511	391
Big Game	0	21,251	391
Designated Trails (miles)			
Hiking	18	0	31
Horseback Riding	0	100	60
Motorcycles	14	0	4
Nature Study	2	1	17
Water-Related Areas			
Boating (surface acres)	1050	16,959	1,234
Lake Swimming (surface square feet)	0	0	
Miles of Stream (fishing)	6	4	6
Lake Fishing (surface acres)	631	17,778	1,253

Sources: 1976 State Comprehensive Outdoor Recreation Plan for New Mexico (State Planning Office); Environmental Statement, Star Lake - Bisti Regional Coal, BLM 1980.

they are also included here because of their recreational use. Since they are WSAs, BLM has the responsibility to protect the wilderness characteristics of the areas until Congress determines whether they should be included in the National Wilderness Preservation System. Because of the pending coal mining in the region, an accelerated study program has been implemented for the Bisti, De-na-zin, and Ah-shi-sle-pah WSAs.

The most prominent of these WSAs, and the closest to the proposed NMGS plant site, is the Bisti WSA. This study area superbly represents the natural processes of accelerated erosion and the periodic uncovering of fossil remains. It is a noted recreation resource for primitive and unconfined activities such as sightseeing, photography, and hiking and offers a unique visual experience to the visitor, with an overwhelming impression of naturalness and solitude. Primitive camping and picnicking also take place at the Bisti. The Bisti WSA has a reported moderate to low visitation because of the remote location, access by unimproved and unmarked roads, lack of drinking water and sanitation facilities, and limited public awareness of the site. In addition to being a WSA, the Bisti has been identified by BLM as an area to recommend for inclusion in the National Registry of Natural Landmarks and is being considered for designation as an Area of Critical Environmental Concern (ACEC) by the BLM if it is not designated wilderness. ACEC designation is a BLM management classification designed to provide special consideration for recreational, natural, and scientific values.

Other WSAs in the study region include De-na-zin (a larger geographic area with badlands formations of scenic recreational value similar to the Bisti), which is located immediately east of the plant site, and La Lena, Empedrado, Ignacio Chavez, Ah-shi-sle-pah, Chamisa, Cabezon, and Ojito, all located southeast of the plant site but near two of the alternative transmission corridors. Each of these WSAs has natural features and scenic qualities that provide outstanding opportunities for a variety of recreational pursuits, including sightseeing, photography, and hiking. Since these WSAs are undeveloped and without drinking water or sanitation facilities, use for camping and picnicking is minimal.

Angel Peak, a BLM-developed recreation area, is located 13 miles southeast of Bloomfield. The area is referred to as the Nacimiento Badlands; the top 100 feet of Angel Peak, composed of hard sandstone, is the only segment of the San Jose Formation remaining in the badlands area. The park itself has 16 family camping and picnic units.

In San Juan County, Utah, BLM has two recreation areas within the 100-mile radius of Farmington: the Grand Gulch Primitive Area and Sand Island. Sand Island is located along the San Juan River and has camping, picnicking, and float-boating.

The corridor identified for selection as the Continental Divide National Scenic Trail in the NMGS study region falls on BLM land (Map 3-1). The proposed corridor for the trail is crossed by all four transmission line routes.

The Continental Divide National Scenic Trail corridor was formally established under the National Parks and Recreation Act of 1978 and was directed to be the primary management responsibility of the Forest Service, in cooperation with other federal agencies. The intended long-range purpose of the Continental Divide National Scenic Trail is to provide a continuous route for public use near the continental divide which is compatible with other local land uses.

Tribal Resources

Lands within New Mexico that are administered by the Bureau of Indian Affairs include 6,471,286 acres of tribally owned land, 679,672 acres owned by individual Indians, and 337,799 acres of federally owned land--for a total of 7,488,757 acres.

The Native Americans of New Mexico are developing new resources each year to add to the total number of outdoor recreation facilities of the state. Tribal lands and waters are being opened to the public for hunting and fishing, as well as for picnicking and camping.

The Navajo Indian Reservation, the largest Indian land area in the project region, lies just west of Farmington. The Navajo Park and Recreation Department administers 16 recreation sites in New Mexico where hunting and fishing are permitted. Although developed campsites and picnic areas are not available at most Navajo recreation areas, both camping and picnicking are permitted.

The Jicarilla Apache Reservation is approximately 60 miles east of Farmington. Twenty thousand acres in the Horse Lake Mesa district have been set aside as a game park. Fishing lakes, such as the major development at Stone Lake, include boat docks, picnic shelters, and a lodge.

U.S. Forest Service

The Forest Service administers seven national forests in New Mexico, three of which are within 100 miles of the NMGS study area. These are the Carson National Forest, containing some 1,391,369 acres in the northern part of the state; the Santa Fe National Forest, covering 1,579,462 acres in the Sangre de Cristo and Jemez mountains; and the Cibola National Forest, which has 1,615,216 acres over several widely scattered mountain ranges.

Only the Jicarilla Ranger District in Carson National Forest is within 60 miles of the study area. The Mt. Taylor Ranger District in Cibola National Forest and the western half of the Santa Fe National Forest are within 100 miles of the study area. Camping, picnicking, and fishing are the primary recreation activities in the ranger districts. Combined, these areas offer 30 camping and picnicking areas, with 461 family units. Table 3-11 indicates the number of visitors for different sites in the national forests.

National Park Service

The National Park Service administers five recreation areas. The Aztec Ruins National Monument and the Chaco Culture National Historical Park are two major attractions within San Juan County. The Aztec Ruins National Monument in northern San Juan County preserves the ruins of one of the largest pre-Spanish villages in the Southwest. Chaco Culture National Historical Park contains 12 major Indian ruins and more than 1200 smaller archaeological sites representing the highest point of Pueblo prehistoric civilization.

Hovenweep National Monument straddles the Utah-Colorado border north of Four Corners. The towers, granaries, and dwellings clustered in six groupings date a pre-Columbian Indian culture from A.D. 900 to 1276. Mesa Verde National Park, which is located in extreme southwestern Colorado, was established in 1906 and contains about 52,000 acres.

Chaco, Mesa Verde, and Hovenweep have camping and picnicking facilities. Table 3-12 shows park attendance for 1980.

Lake Powell is the centerpiece of the Glen Canyon National Recreational Area in Utah; it was formed by the Glen Canyon Dam, towering 710 feet above bedrock, 583 feet over the original channel of the Colorado River. The lake is the second-largest man-made lake

Table 3-11. RECREATION USE REPORTED FOR FISCAL YEAR 1980 ON DEVELOPED SITES IN NATIONAL FORESTS

Forest	Site Name	Site Use	1980 Visitor Days
Carson	Gasbuggy	Observation site	1,600
Cibola	Quaking Aspen	Campground	19,800
	Coal Mine	Campground	19,900
	McGaffey	Campground	20,800
	Canyon Lobo	Campground	4,700
	Ojo Redondo	Campground	6,300
	McGaffey	Picnic ground	11,500
	McGaffey	Rec. residences	2,100
	Coal Mine Nature Trail	Interpretive site	2,700
	McGaffey Nature Trail	Interpretive site	5,600
Santa Fe	Rio Puerco	Observation site	2,300
	Tsiping Ruin	Observation site	400
	Clear Creek	Campground	20,500
	Rio Las Vacas	Campground	10,900
	Jemez	Observation site	13,200
	San Antonio	Campground	67,300
	Horseshoe Springs	Campground	5,600
	Jemez Falls	Campground	17,600
	Las Conchas	Campground	13,400
	Paliza	Campground	24,400
	Swen Springs	Campground	14,700
	Redondo	Campground	42,900
	Paliza Group	Campground	17,500
	Battleship Rock	Picnic ground	63,600
	Indian Head	Picnic ground	9,400
	Dark Canyon	Picnic ground	7,500
	La Cueva	Picnic ground	14,000
	Camp Shaver	Organization site	18,900
	APS Campsite	Organization site	4,700
	Horseshoe Springs	Rec. residence	19,500
	San Juan Mesa Ruin	Documentary site	300
	San Antonio Handicap Trail	Interpretive site	500
	Ranger Station	Interpretive site	46,200

Source: Printout from National Forest Service.

Notes: Organization sites = Boy Scout, YMCA, church camps, etc.
Recreation residences = summer homes
Documentary sites = natural or cultural history sites
Interpretive sites = demonstration or information sites

Table 3-12. VISITS TO NATIONAL PARKS WITHIN THE STUDY REGION

Recreation Site	1972	1976	1980	Percent Change 1972-1980
Aztec Ruins National Monument	79,430	67,170	56,850	-28%
Chaco Culture National Historical Park	32,900	30,550	51,650	+57%
Hovenweep National Monument	12,100	19,384	13,757	+14%
Glen Canyon National Recreation Area	970,900	1,061,716	1,646,968	+70%
Mesa Verde National Park	546,286	676,935	540,826	- 1%

Sources: SCORP 1976; National Park Service computer printout, Southwest Region; National Park Service Computer Printout, Utah Office.

in the United States, second only to Lake Mead behind Hoover Dam. Watersport opportunities at the lake include waterskiing, motorboating, houseboating, sailing, fishing, and swimming. Glen Canyon has three campgrounds (in Utah), with a total of 157 camping units.

State Parks and Recreation Commission

The commission administers five state parks and one state monument within the study area. The parks are Navajo Lake (Pines and Sims Mesa) in San Juan County, El Vado Lake and Heron Lake in Rio Arriba County, Bluewater Lake in Valencia County, and Red Rock in McKinley County. Jemez Monument is the one state monument. Attendance at these parks is given in Table 3-13.

Navajo Reservoir, located 25 miles east of Aztec and 36 miles east of Farmington, is the single most popular recreation resource in the immediate study region, primarily because of its proximity to the communities of residence and its water-based resources. The reservoir has two state parks, Pines and Sims Mesa. This Navajo state park consists of a 15,600-acre reservoir and 18,459 acres of adjacent land. It offers boating, fishing, and water skiing and provides camping-picnicking units with benches, tables, and fireplaces as well as parking pads for trailers, modern restrooms, rental boats, mooring lines, marine supplies, and a modern marina with launching ramp. The reservoir has two campgrounds, one at Pines and the other at Sims Mesa. Park officials have indicated that for the summer of 1981 the Pines Park was so popular on peak weekends the park could not accommodate the demand (Findling 1981). A new campground is planned to be completed in 1983 to help alleviate the current problems of overcrowding.

Table 3-13. ATTENDANCE AT NEW MEXICO STATE PARKS

Recreation Site	1979	1980	Percent Change
Bluewater Lake	164,137	217,680	33
El Vado Lake	23,267	25,915	11
Heron Lake	64,309	65,971	2.6
Navajo Lake (Pines)	202,835	241,400	19
Navajo Lake (Sims Mesa)	6,327	9,837	55

Source: Visitation Count for New Mexico State Parks, computer printout.

Note: State records may be on the high side because traffic counters are often used (Brown 1981).

Both El Vado Lake and Heron Lake are located over 80 miles from Farmington, in Rio Arriba County. El Vado offers boating, waterskiing, and fishing. Its available facilities include camping-picnicking units with tables, benches and fireplaces, trailer spaces, convenient water supply, and marina with concrete launching ramp. This state park has 3220 surface acres of water and 1728 acres of adjacent land.

Heron Lake consists of 4107 acres of land area and 5905 surface acres of water. It offers boating and fishing, and provides picnicking and camping units, boat ramps, and boat marina.

Bluewater Lake is over 100 miles south of the Farmington area. The park is very popular and is currently overcrowded on peak weekends. The lake is suitable for boating, fishing, and swimming. The following recreation facilities are available: camping-picnicking units with tables, benches, and fireplaces; modern restrooms; restaurant and store with camping-picnicking supplies; and modern service dock and boat ramp.

Red Rock is a 640-acre park with a three-ring rodeo arena, a new intertribal ceremonial dance ground, a visitors' center, and 140 campsites with water, electricity, and sewer hookups.

Jemez Monument is located at the north edge of the village of Jemez Springs, in the ruins of a seventeenth-century Franciscan mission church and convent adjacent to the remains of the Pueblo of Guisewa. Museum exhibits and interpretive trails through the ruins tell the complete story of the mission church of San Jose de los Jemez and the people who lived there. Picnic and camping facilities are to be found in nearby Forest Service areas in the Jemez Mountains. The attendance at Jemez in 1975 was 10,685, and in 1980 it was 18,024, an increase of 69 percent.

State Department of Game and Fish

The Department of Game and Fish has five recreation areas in San Juan County: Jackson Lake, Nabor Ranch, Miller Mesa, San Juan River Easement, and Navajo Dam Land and Wildlife Management Area. Jackson Lake is 840 acres and is stocked for fishing. Boating is allowed, and there is hunting for waterfowl. Jackson Lake (which is located 9 miles north of Farmington) also has camping and picnicking. Nabor Ranch has camping, and hunting for deer, bear, and waterfowl. Miller Mesa has a lake for fishing, and there is hunting for deer and bear.

San Juan County Museum Association

Salmon Ruin consists of many colonies established by the Chacoans in the eleventh century. Salmon pueblo is one of the largest colonies; it was built by people from Chaco some 50 miles away. The Chacoan culture was one of the most sophisticated and complex pre-Columbian civilizations in North America. Salmon Ruin and the San Juan County Archaeological Research Center and Library are located on paved U.S. Highway 64, two miles west of Bloomfield. The museum and ruin are open seven days a week. Picnic grounds and a camping area are planned in the near future.

Planned and Proposed Recreation Resources

Recreation resources not existing at the time of this inventory but planned or approved for future development are described below.

An additional campground is planned for construction in 1983 at Navajo Reservoir. The developed site will be located on the San Juan River just below the Navajo Dam. The park is planned to have 40 campsites, 15 picnic tables, electricity, water, and restrooms and to offer opportunities for fishing, rafting, canoeing, and limited swimming (Findling 1981).

The proposed Animas-La Plata water storage project would develop water for irrigated agriculture and for municipal and industrial use in New Mexico and Colorado. The primary construction features of the project would be the Ridges Basin Reservoir system and the Southern Ute Reservoir system. The major feature of each system would be an offstream reservoir. Recreation facilities would be constructed at both of the proposed reservoirs to help meet existing and projected needs for camping, fishing, boating, picnicking, and sightseeing. The proposed facilities would accommodate 2720 people at one time and an estimated annual use of 307,500 recreation days.

The development at Ridges Basin Reservoir, accommodating 1800 people at one time and 210,000 recreation days annually, would include 10 miles of hiking trails, 54 camping units, 48 picnic units, a seven-lane boat ramp, a boat dock, 3 miles of paved access roads, 574 parking stalls, and an entrance station and administrative building. Drinking water, electricity (not at individual camp units), and minimal sanitary facilities would be provided. The project would be located approximately 45 miles from Farmington, in Montezuma County in Colorado.

Recreation development at Southern Ute Reservoir, accommodating 920 people at one time, and 97,500 recreation days annually, would include 76 camping units, 16 picnic units, a four-lane boat ramp, a boat dock, 2 miles of paved roads and 5 miles of graveled access roads, 276 parking stalls, and an entrance station and administrative building. Drinking water, electricity (not at individual camp units), and minimal sanitary facilities would be provided. The project would be located 21.5 miles from Farmington at the state line, traversing both San Juan County, New Mexico, and Montezuma County in Colorado.

RECREATION ACTIVITIES

The BLM, through its Recreation Information System, has evaluated the natural resources of the region to determine their capability to provide a quality experience for those participating in a specific recreation activity. The quality rating of the experience is based on the existing condition of the recreation resource and other related conditions prevailing during the primary use season of that activity. Recreation activities were rated into three categories according to their capability to provide a quality experience.

Most activities in the study area are of the dispersed type (i.e., sightseeing, ORV use, hiking). For many of these activities, spring and fall are the primary seasons of use. The amount of summer use depends on weather conditions such as temperature, wind, and dryness. Water-related activities (fishing, boating, swimming) are the most popular forms of summer recreation in the region, followed by camping, picnicking, and hiking, which primarily take place in the forested resource areas during the summer months.

The following is a discussion of recreation within the project region, organized by activity type, which directly relates to the major resource areas identified above. Table 3-14 indicates the most popular activities for Planning District 1. Appendix 1 lists recreation activities and the recreation sites where they are available.

Hunting

The BLM has rated the Chaco Planning Unit for a variety of recreation opportunities, including hunting. The purpose of these

Table 3-14. MOST POPULAR ACTIVITIES FOR SCORP'S PLANNING DISTRICT 1 IN 1980

Rank	Activity
1	Picnicking
2	Fishing
3	Park Visits
4	Bicycling
5	Pool Swimming
6	Pleasure Walking
7	Horseback Riding
8	Hunting
9	Camping
10	Baseball
11	Lake or River Swimming
12	Boating
13	Hiking/Backpacking
14	Tennis
15	Golfing
16	Jogging
17	Football
18	Snow Skiing
19	Waterskiing
20	Trailbiking/4-Wheeling
21	Rodeos
22	Sport Shooting
23	Cross-Country Skiing

ratings is to determine the quality of experience a hunter can expect in the rated area. Wildlife populations in the Chaco Planning Unit are sparse. Information on present wildlife numbers, population trends, and distribution is minimal; but big game populations are considered to be particularly limited. Competition with livestock, lack of water, and human disturbances are major conflicts. Another stumbling block to hunting concerns the land ownership pattern. BLM administers only 17 percent of the land surface in the Planning Unit, and for the most part these tracts are scattered and intermingled with tracts controlled by private owners and other agencies. Locked gates, landowner resentment, and lack of knowledge of land ownership all pose problems to the hunter.

Big Game. Although it has been illegal to hunt antelope within this Planning Unit since 1978, some areas were rated on a basis of hunting for antelope because the restrictions could conceivably be lifted at any time in the future.

The Chaco Planning Unit has an overall rating of C for big game (antelope, deer and elk). Class C is the lowest rating, and A is the highest.

Small Game. Small game populations in this area are low and growth is limited by the water supply. This area receives some hunting, but land ownership and fence problems can be expected. The overall rating for small game in the Chaco Planning Unit is a C.

Fishing

In Planning District 1, fishing is the second most popular outdoor recreation activity. The closest lakes to Farmington are

Farmington Lake, which is 3 miles out of town, and Jackson Lake, which is 9 miles out of town. Jackson Lake is stocked with trout, bass, and catfish. Farmington Lake has trout, bass, catfish, and crappie. Navajo Lake, Bluewater Lake, and the San Juan River are the most popular places to fish. The first 8 miles below the Navajo Dam is considered the best trout fishing area in New Mexico. Both the Navajo Indian Reservation and the Jicarilla Apache Reservation have numerous small lakes for fishing.

Boating/Swimming

Opportunities for boating and swimming in the region are limited, as in most semiarid regions. Water-based recreation is generally confined to the region's larger lakes. Navajo Reservoir and Lake Powell in Glen Canyon National Recreation Area in Utah are among the most frequently used recreation resources for boating and swimming in the area.

The Navajo Lake Reservoir is located approximately 38 miles east of Farmington. The reservoir has 13,251 acres of water area and is extensively used for motorboating, waterskiing, and houseboating. Rafting, canoeing, sailboating, and swimming are also available at Sims Mesa Park on the reservoir. The park had over 250,000 visitors in 1980.

Lake Powell is the second-largest man-made lake in the United States. The Glen Canyon National Recreation area had over 1.5 million visitors in 1980. The lake has a number of marinas with launching ramps and houseboats for rent. Besides motorboating and houseboating, sailboating has become increasingly popular. Waterskiing and swimming are also popular sports at this large lake. Although the lake is over 100 miles west of Farmington, it still attracts a lot of people from the area because it has so much to offer.

Float-boating is popular on the San Juan River between Sand Island and Clay Hills in Utah, as well as areas on the river in New Mexico. The Rio Chama below El Vado Dam and the Animas River in Durango are also popular areas for float-boating. Canoeing opportunities are available at Sims Mesa, Asaayi Lake, and Morgan Lake. Besides Sims Mesa and Lake Powell, sailboating is available on Jackson Lake and Asaayi Lake.

Bluewater and El Vado lakes also offer many of the same opportunities as Navajo Lake and Lake Powell. However, these two lakes are much smaller and over 100 miles from the Farmington area. There are also a number of smaller lakes on both the Navajo and Jicarilla Apache reservations which offer boating opportunities.

Camping/Picnicking/Hiking

Participation estimates for specific recreation activities by New Mexico residents for 1975 indicate that picnicking is the most popular family recreation activity. It is also the most popular family activity for Planning District 1. Most camping and picnicking takes place in the cooler forested or mountainous areas and near major water bodies in the region. Popular areas include Navajo Reservoir, Glen Canyon National Recreation Area, Carson National Forest, Santa Fe National Forest, Cibola National Forest, and areas along the San Juan River. San Juan County has 98 acres devoted to camping, McKinley County has 519 acres, Rio Arriba County has 2202 acres, and Sandoval has 1682 acres (SCORP 1979).

The national forests provide opportunities for picnicking, camping, and hiking. For this study the ranger districts within 100 miles from Farmington were inventoried. The Carson National Forest, Jicarilla Ranger District, is the closest to the Farmington area, approximately 50 to 60 miles east. The Jicarilla Ranger District has primitive camping and picnicking areas. There are a total of 84 family units in the Carson National Forest within the study area. The Santa Fe National Forest is within 100 miles from Farmington and has 243 family units available. The Cibola National Forest is the farthest away from Farmington and has 134 family units within the study area.

Hovenweep National Monument, Mesa Verde National Park, and Chaco Culture National Historical Park all have picnic and camping units. Chaco has 35 campsites, Hovenweep has 31, and Mesa Verde has 477.

Navajo Lake, Bluewater Lake, El Vado Lake, and Heron Lake State Parks and Glen Canyon National Recreation Area offer opportunities for camping and picnicking. Navajo Lake and Glen Canyon are among the most frequently used camping resources because of excellent watersports available at both. Navajo Lake has 80 camping units at Pines and 65 camping units at Sims Mesa. Glen Canyon has three campgrounds with a total 157 camping units.

The Navajo and Jicarilla Apache Indian reservations both provide camping and picnicking opportunities. The Navajo Indian Reservation has 11 recreation areas for primitive camping and picnicking. The Jicarilla Apache Reservation has 4 recreation sites for camping.

Angel Peak Park is one of the closest areas to the Farmington area that provides camping, picnicking, and hiking opportunities. The park, located 13 miles southeast of Bloomfield, has 16 family camping and picnicking units.

Combined, these areas offer approximately 861 camping and picnicking sites. Though the WSAs do not offer facilities (drinking water, sanitary facilities, picnic tables, campsites, etc.), some primitive camping and picnicking take place there.

Sightseeing/Historical/Interpretive

Sightseeing is considered one of the most important aspects of recreation in the affected environment. A large percentage of public lands near the proposed plant site and along the proposed water pipeline route P1 have been rated by the BLM as Class A for this recreation category. The study area has many unique geological, archaeological, and historical areas which are located in remote natural areas and provide excellent opportunities for sightseeing, as well as an exceptional perception of solitude.

The Bisti WSA, for example, located just northwest of the proposed plant site, is a unique geologic area which attracts visitors because of both its scenic and historical value. The other WSAs in the region (identified above) are similarly noted for their outstanding scenic qualities and are particularly valued because they are surrounded by vast expanses of predominantly open and undeveloped landscapes.

Chaco Culture National Historical Park, Hovenweep National Monument, Mesa Verde National Park, Simon Canyon ACEC, and Salmon Ruin also offer excellent opportunities for sightseeing. All of these parks contain many archaeological sites with evidence of a variety of different stages and cultures dating back centuries.

ORV Use

The number of ORV registrations in San Juan County increased 43 percent between 1976 and 1980 (see Table 3-15). The study area as a whole is good for ORV use, as it has terrain and soil characteristics that users prefer. There is a variety of terrain in the region, including rolling hills, mesas, canyons, washes, badlands, and mountains. Most ORV use in the region is associated with ranching and mining activities, and is widely dispersed and not very intense. There is some ORV use associated with hunting.

Table 3-15. VEHICLE REGISTRATIONS FOR SAN JUAN COUNTY

Year	Trucks	Recreation Vehicles	Motor-cycles	Total ORV
1976	18,615	2530	2268	23,413
1977	21,020	2781	2464	26,265
1978	23,589	3361	2669	29,619
1979	25,138	3506	2992	31,636
1980	26,733	3515	3176	33,424
Percent Increase from 1976 to 1980	44%	39%	40%	43%

Source: New Mexico Department of Motor Vehicles, Farmington.

Winter Sports. Within the study region there are downhill skiing opportunities at Purgatory Ski Area, Hesperus Ski Area, and Stoner Ski Area in Colorado, and Bluemountain Ski Area in Utah. At Bluewater Lake, El Vado Lake, and Navajo Lake there is ice fishing. Ice skating is also available at Bluewater Lake. There are numerous other ski resorts within extended driving range of the study region.

4.0
ENVIRONMENTAL CONSEQUENCES

NONURBAN RECREATION RESOURCES

The assessment of recreation consequences includes all three phases (construction, operation, and abandonment) of development for each of the separate components of the NMGS project: the generating plant, the water supply system, and transmission lines. Except where noted, affected areas are the same for both the construction and operation work force because of the common areas of residence and similar recreation interests. Critical factors in the determination of significance include the direct and indirect effects on the recreation resources (use of land or water; disturbance to vegetation, habitat, or outstanding landscape characteristics); changes in the quality of the recreation experience (such as from increased noise, reduced visibility; and from increased activity demand and subsequent overcrowding of facilities).

Significant recreation consequences are described according to the nature of the impact, the magnitude of change, and duration of change. Short-term consequences, lasting less than two visitor seasons, are usually considered insignificant. For purposes of this assessment, the most recently reported recreation resource inventories and participation rates are used, along with past trends, to identify significant consequences. Where information is available, proposed recreation development is also included in the assessment.

The discussion of significant recreation consequences is organized into two separate, but related, parts. The first part is a discussion by project component and focuses on specific changes to the recreation resource base and site-specific recreational experiences. The second part is a discussion by recreation activity and includes the effects of all project components together, with a focus on the increased demand for specific recreational opportunities and use of facilities in the study region.

PROJECT COMPONENTS

Generating Plant

The primary recreation use of the plant area (and within a 5-mile radius of the area) is primitive and unconfined. A portion of the Bisti Badlands has been designated a WSA and is located approximately 3 miles northwest of the proposed plant site. The rugged, broken badlands dominating the Bisti WSA provide exceptional recreation opportunities for hiking, primitive camping, photography, and sightseeing. Because of its natural and uninhabited surroundings, and low visitation, the Bisti WSA also offers an outstanding opportunity for solitude.

The De-na-zin WSA is located approximately 6 miles northeast of the plant site. Like the Bisti, this area also offers opportunities for hiking, photography, and sightseeing, as well as an exceptional experience of solitude. Both WSAs are rich with remnants of past geologic periods, which adds interest and educational perspective to the nature experience. (See the Wilderness Values and Visual Resources technical reports for further descriptions of these areas.)

Recreation activities within the Bisti and De-na-zin are guided by BLM management plans. Specific attention is given to preserving the natural integrity of the landscape and preventing irreparable damage to important historic and paleontological resources (e.g., fossil remains). Consequently, use by ORVs is limited to existing pathways, and they are prohibited from the fragile inner portion of the Bisti WSA. Fossil collecting is also prohibited within the protected area of the Bisti.

Significant consequences would result from both the construction and operation phases of the proposed NMGS in relationship to the two WSAs. Construction activities, which are expected to take place over a period of 13 years, would significantly detract from the experience of solitude that is so prevalent and is directly tied to the quality of the recreation experience reported for these areas. Noise from heavy equipment at the construction site and from the increased number of vehicles traveling to the site would draw attention to the construction activities. Similarly, dust from vehicle movement and excavation activities would affect the amenities in the WSAs and the clarity of distant landmarks in the horizon, as viewed from these sites (see the Air Quality Technical Report).

During the operation phase of the proposed NMGS, the most pronounced distraction to the wilderness recreation experience would be the physical presence of the plant and support facilities (rail line, transmission lines, etc.) and the associated activity level (e.g., vehicles). The visual contrast of the plant structures against the natural landscape surrounding the site would significantly detract from the perception of solitude and naturalness presently experienced. Noise and dust associated with plant operation (e.g., from coal handling) and vehicle movement would further affect the quality of the recreation experience in the plant area of influence. Night lighting of the facility would be visible from both WSAs (but most pronounced from the Bisti WSA), affecting the quality of primitive camping. The extent of impact within each of the WSAs is influenced by distance from the site and natural topographic features. There would be pockets within each WSA where the visitor is enclosed by hills and geologic formations that would buffer the sights and sounds of the plant from perception. Noise and visual intrusions would be greatest as visitors climb to the elevated portions of the WSAs to reach points where the vista of surrounding landscapes is expansive. Impacts from those elevated vista points would be most sensitive along the south side of the Bisti WSA and the southwestern perimeter of De-na-zin WSA.

Of direct consequence to the WSA's resources would be the increased use from the plant labor force.

Water Supply System

None of the water supply system components would actually cross or come in direct contact with developed recreation sites. Consistent with the biology assessment, it has been determined that fishing along the San Juan River would not be affected because most of the primary fishing sites are located adjacent to the Navajo Reservoir and sufficiently distant from the water intake (the quality of fishing decreases farther down the river where the diversion channel would be located). Short-term (less than 2 years) disruption to the visual and wilderness experience may result during construction of the water pipelines where they come within the "seen area" of the Bisti and De-na-zin WSAs.

Transmission System

Only one of the alternative transmission lines would actually cross a recreation area. Route T4 would traverse the Cibola National Forest. However, because this alternative would parallel an existing power line and would not cross any of the developed recreation sites or trails, it would not significantly affect recreational activities. The other three alternatives would not actually cross developed recreation sites, but two of them (T2 and T3) would come within 1 mile of scenic and sensitive recreation resources such as the northeastern rim of Chaco Culture National Historical Park and Chaco Mesa. All the alternatives except T4 have a portion of the rights-of-way (ROW) within view from the Empedrado, La Lena, Cabezon, and Ojito WSAs. However, because the transmission line ROWs for the most part would be located away from the most scenic landscapes or follow existing transmission lines, pipelines, and roadways, they would not significantly affect the quality of recreational activities in the WSAs except in a few select locations, as described below.

Transmission towers and conductors would result in visual contrasts most noticeable from the eastern side and top of Cabezon, from mesas along the western edge of Ojito (e.g., Bernalillito), and from Chaco Mesa. The transmission lines would cut across the natural landscape in an unnatural way, affecting the quality of the view from sites used for recreational purposes (photography, sightseeing, climbing, hiking, visiting historical sites). Specific contrasts in line and form are discussed in more detail in the Visual Resources Technical Report.

Transmission lines would cross the Continental Divide National Scenic Trail at the following locations: MP 50 for the T1 line; MP 45.5 for the T2 line; MP 46.5 for the T3 line; and MP 53 for the T4 line. The transmission lines would span the trail and thus would avoid actual disturbance to the trail. Consequences are directly related to the visual intrusion that the transmission lines make, and their subsequent change to the perceived naturalness of the scenery. These consequences are discussed more completely in the Visual Resources Technical Report.

RECREATION PARTICIPATION

The following is a discussion of significant recreation consequences related to the increased demand for recreation resources resulting from the construction and operation of all project components considered together. The discussion is organized by recreation activity, with reference to specific resource areas likely to be significantly affected. The recreation resource base extends to parts of four states and includes activity areas considered to be within a reasonable day's driving distance of the major communities of residence for the particular activity. Appendix 2 summarizes the projected increase in recreation activities from NMGS-related population influx during the peak employment year, 1992.

Hunting

Since neither big game or small game hunting is highly rated in the Chaco Planning Unit, the proposed project would not significantly affect this activity. Further, additional hunters from the project work force would probably seek permits in the more popular dispersed game areas outside the immediate project area.

Winter Sports

Participation in skiing and snowmobiling would increase at ski areas in Colorado and Utah. Because the demand for winter sports in the area is low and resource areas are numerous, the increase from the NMGS labor force would not place added constraints on developed facilities. Further, the increases in participation days could provide added income to existing facilities and increase the potential for further development of resources.

Fishing

Fishing is the second most popular activity in Planning District 1. Due to the limited number of water resources within the region, and the lack of public access to them, fishing is generally limited to parts of the San Juan River, small local lakes (such as Farmington Lake, Bluewater Lake, and Jackson Lake), and the Navajo Reservoir. The number of fishing days for the two-county region would increase by 7183 with the increase in population due to the proposed project.

This increase could add a significant demand to nearby resources such as the Navajo Reservoir, which is already experiencing rapid increases in participation rates. Both per person catch and the quality of the fishing experience would be affected by increased demand at these areas.

Water-Based Recreation

Boating, swimming, and waterskiing are popular recreation activities in New Mexico and have been steadily increasing along with general population increases. Because the region is semiarid, opportunities for these activities are severely limited, placing heavy demands on the few existing water-based recreation resources within close proximity to Farmington. From 1979 to 1980, attendance at Navajo Lake (Pines) increased 19 percent, and at Navajo Lake (Sims Mesa) it increased by 55 percent. Navajo Lake park supervisors have reported that the developed areas are already experiencing overcrowding on peak weekends. Bluewater Lake experienced an increase of 33 percent from 1979 to 1980; this park is also experiencing overcrowding. Participation in water-based recreation, particularly at such nearby resource areas as Navajo Lake, would increase with the increase in population due to the proposed project. There would also be an increase in float-boating on the San Juan, Animas, and Chama rivers. Total participation days for water-based recreation activities in the two-county area would increase by 4176 during the peak employment period (1992) for NMGS. Of this total, 2345 would result from new residents of Farmington. This increase would place added pressure on the existing water-based recreation resources. Crowded conditions for boating, waterskiing, and swimming would be affected and could force local residents to drive farther to find less populated resources.

The Animas - La Plata Project currently being planned would help alleviate some of the pressure on existing water-based recreation resources. The two proposed recreation facilities would have a total of 130 camping units and 64 picnic units. The facilities would accommodate 2270 people at one time and an estimated annual use of 307,500 recreation days.

Camping/Picnicking/Hiking

Participation estimates for specific recreation activities by New Mexico residents for 1975 indicate that picnicking is the most popular family recreation activity. Most camping, picnicking, and hiking in the summer months takes place in the cooler forested or mountainous areas such as Carson National Forest, Santa Fe National Forest, and Cibola National Forest. The Navajo Reservoir, Glen Canyon National Recreation Area, and sites along the San Juan River are also popular areas for camping and picnicking in this region. Hovenweep National Monument, Mesa Verde National Park, and Chaco Culture National Historical Park also have campsites, picnic areas, and hiking areas.

The total participation days in camping, picnicking, and hiking with the NMGS project for the two-county region would be 54,669 in 1992. The projected NMGS participation days represent 10,208 of this total. The increase would place additional demands on the already stressed recreation resource base in the project region. As indicated in Chapter 3.0 of this report, there are approximately 861 available (developed) camping and picnic sites in the study region. Since recreation budgets have been reduced for a number of the managing programs, development of additional facilities is unlikely in the near future. Some developed sites such as those at Navajo Lake State Park could experience an increase in use well beyond their capacity to provide adequate maintenance and supervision of facilities. Problems such as vandalism, fire, increased litter, noise, and damage to fragile vegetation from unauthorized ORV use often accompany rapid influxes of visitors.

Because most of the work force is expected to reside in Farmington and outlying communities, the brunt of the impact could be expected to occur at Navajo Lake. The park is currently experiencing overcrowding. Park officials have indicated that Navajo Lake State Park could not accommodate the demand on peak weekends in 1980. A new campground is planned for construction in 1983 to help alleviate some of the current problems of overcrowding. There are also plans to pave the presently unpaved access road to Sims Mesa State Park, allowing better use of this resource.

Angel Peak, a BLM-managed recreation area, is one of the closest campgrounds to the Farmington area. The increase in use due to the NMGS work force could affect BLM's ability to effectively manage this resource. The park is small, with only 16 camping and picnic sites.

Chaco Culture National Historical Park could also be affected by the proposed project, along with other development in the coal region. Visits to the park from 1972 to 1980 increased by 57 percent. Reported visits in 1981 reached 77,000. The park has experienced a 17 percent annual growth rate over the past three years, and park officials estimate that visitation could reach as high as 100,000 following coal development in the San Juan region (Herriman 1981). Recent budget cuts within the National Park Service have reduced the number of park staff to six full-time and five temporary summer staff. There are no further facility plans for the park. Highway 57 from Highway 44 is the major access route, leading to the park's eastern entrance from communities to the north. Once N.M. 371 is paved, it will also provide access from Farmington to the park. Future plans include rerouting northern visitors around the perimeter of the park to the official eastern entrance. With additional improved access to the park, visits will increase even without NMGS. Though the park presently has modest use, a rapid increase, such as expected, would significantly change the quality of the individual recreation experience currently possible at the ruins, and could generate supervisory problems related to overcrowding of campsites, picnic areas, and hiking trails. Increased litter, vandalism, damage to natural features (vegetation, habitat), and increased use of water (drinking) and sanitary facilities will also have significant consequences. Parking areas, waste disposal, and traffic flow may have to be expanded to accommodate peak visitor days.

Primitive camping, hiking, and picnicking also take place at the Bisti and De-na-zin WSAs; however, because these are remotely located, accessible only by unmarked dirt roads, and without drinking water or sanitary facilities, they are frequented only by the most enthusiastic visitors. Numerous consequences could result from increased visitor use of the WSAs. Litter, vandalism of cultural resources, fire, and removal of paleontological material could all significantly degrade the quality of the resource if not actively supervised.

Sightseeing/Historical/Interpretive

Sightseeing is considered one of the most important aspects of recreation in the study region. The study area has many unique geological, archaeological, and historical areas, such as Chaco Culture National Historical Park and the Bisti and De-na-zin WSAs. These three areas are located in close proximity to the NMGS plant site, and water supply pipelines, and transmission lines. These resource areas would be easily accessible to workers and their families.

The Bisti WSA represents one of the most unique scenic features in the region, and the Chaco Culture National Historical Park is one of the most popular historical sites. Mesa Verde National Park is also located within the study region, but it is of sufficient size and distance from the immediate area of influence to avoid significant consequences. At the present time the recorded visitor days to historical sites on public lands in the immediate study area (within the BLM Chaco Planning Unit) are slightly less than 10,000 per year. Projections for the year 2000 estimate that annual visitor days to historical sites will increase by 7000 annual visitor days (C-MFP-R.2-10.276). Total visitor days projected for the BLM planning unit include 40,872 for sightseeing and 97,581 for photography by the year 2000. In 1990, the NMGS work force would represent 4550 participation days for sightseeing; 1654 days for visiting historical sites, and 4956 days for photography in the two-county region. Significant consequences of increased visitor use are similar to those discussed for camping and picnicking, and include vandalism to cultural resources, litter, theft of paleontological material, and degradation to the visitors' ability to experience solitude.

ORV Use

Recreational vehicles, four-wheel drives, and motorcycles (dirt bikes) are common vehicles for this geographic region because of the climate (heavy rains) and the number of unimproved roads. These vehicles are used regularly for commuting and for recreation purposes (hunting, camping, etc.).

The number of people owning four-wheel-drive vehicles and dirt bikes could be expected to increase as the population grows due to the proposed project. The state Department of Recreation estimates an average of 0.556 ORV participation days per capita. Using this multiplier, the NMGS peak employment year would result in an increase of 1806 ORV participation days for the 2-county region. Recreational ORV use in the region is widely dispersed and usually not intense. Though regulations prohibit ORV use in wilderness areas such as the Bisti WSA protected area except on approved pathways, the increase in ORV use around the boundaries of areas used for hiking and picnicking could significantly affect the primitive and unconfined recreation experiences within these areas by creating dust and noise around the perimeter. An increase in ORV use could also lead to problems of landowner-recreationist conflicts when unmarked boundaries are violated and could damage vegetation and soil, leading to erosion when existing pathways are not followed.

5.0

MITIGATION

Recreation consequences are both site-specific and activity-related. Mitigation measures for site-specific consequences focus on physical modifications to the project components. Mitigation for activity-related consequences focuses on augmenting the recreation resource base and improving visitor information sources and supervision of activities. Initial concepts for mitigation of recreation consequences are outlined below.

SITE-SPECIFIC CONSEQUENCES

Generating Plant

Consequences affecting the WSA recreation experience include noise and visual intrusions from plant operations and structures. Visual buffers in the form of earthen berms could be constructed along the public edge of the plant site viewed from De-na-zin (only the top third of the stacks would be visible from Bisti). Earthen berms could be constructed from topsoil moved during plant excavation, and should resemble natural formations and contours to blend with existing landscapes. Large boulders should be incorporated into the design. (See the Visual Resources Technical Report for specific details and artist's concepts.) Night lighting of the plant and stack strobe lights should incorporate shaded sides to prevent direct glare from both WSAs.

Transmission Lines

The primary transmission line consequences would be visual and are addressed in the Visual Resources Technical Report. Mitigation measures include the selection of surface materials and colors for the towers that would blend with the surrounding landscapes, and locating towers where they would result in the least contrast and would not disrupt high-quality views. This treatment would reduce the extent of impact to the quality of the hiking experience for users of the proposed Continental Divide National Scenic Trail.

ACTIVITY-RELATED CONSEQUENCES

Sightseeing and Visiting Historical Places

Consequences in this area, not addressed under Site-Specific Consequences above, include increased visitation to WSAs and the Chaco Culture National Historical Park, as well as some of the other resource areas for this activity in the study region. Since increased visitation can result in crowded conditions, increased litter, vandalism, and stress on existing facilities (such as sanitation and drinking water), possible mitigation measures would include the following: regulating the number of visitors at any given time period through gate control; increasing park supervision; or expanding facilities and parking areas. All of these measures would fall under the purview of the National Park Service or BLM. Since public agencies currently face severe budget cuts and staff reduction, it is unlikely that these measures could be implemented without a method for subsidizing existing budgets.

NMGS could assist in controlling impacts to the nearby De-na-zin and Bisti WSAs through an active employee information program and a pamphlet aimed at building an awareness of the outstanding qualities that these resource areas offer when used with respect. Periodic slide presentations could be arranged in cooperation with the BLM for employees and families to explain the value of the resources and encourage resource protection by the new neighbors. Active gathering of fossils and artifacts should be discouraged by company supervisors and management; however, display cases should be established at the plant headquarters to reinforce the historic value of the resources in the area.

Camping and Picnicking

PNM could provide employees with a printed guide to the range of camping and picnic sites available within a 100-mile radius of the plant site. The company should coordinate through the Public Information Officer on visitation and occupancy at key resource areas (Navajo Lake, Angel Peak, etc.) on a periodic basis (every 2 weeks during peak season) so that employees could be advised to visit less crowded resources.

PNM should provide on-site picnic areas at the plant site for use by employees, visitors, and families. An effort should be made to make these areas aesthetic as well as practical. Landscaping, noise buffers, drinking water, trash facilities, picnic tables and grills, and sun shelters should be provded at each picnic area.

ORV Use

A pamphlet could be developed to discourage misuse of ORVs in the study region. Protected and fragile areas (e.g., the Bisti WSA) should be identified, as well as approved pathways and undeveloped roads for ORV use. PNM could consider designing and constructing a dirt bike course on company land for use by employees and families, and discourage use of these vehicles in unauthorized areas.

6.0

UNAVOIDABLE ADVERSE IMPACTS

Consequences affecting the recreation experience and expectations of visitors to the Bisti and De-na-zin WSAs are unavoidable, given the proximity of the plant to these resource areas and the scale of development (construction) activity. In particular, noise from construction equipment and roadway vehicles, night lighting of the plant site, and visual contrasts with the natural landscape would affect the quality of the recreation experience possible in certain portions of the WSAs (e.g., higher elevations along the southern border of the Bisti WSA and the southwestern edge of the De-na-zin WSA). Most affected would be the opportunity for solitude, a perception of expansive naturalness while hiking and camping, and undisturbed landscapes for nature photography.

7.0

RELATIONSHIP BETWEEN SHORT-TERM USES OF THE AFFECTED ENVIRONMENT AND LONG-TERM PRODUCTIVITY

Increased recreation participation days resulting in competition for resources (campsites, picnic tables, etc.) in the study region attributable to the NMGS work force would peak in 1987, 1992, and 1995, and begin to subside after 1996. This increase, and the resultant pressure on the recreation resource base would be short-term in relationship to the long-term availability of the resource base.

8.0

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

There would be no irreversible or irretrievable commitments of recreation resources as a result of the proposed project.

9.0

COMPARISON OF ALTERNATIVES

Direct and indirect consequences to recreation resources would occur for the no-action generation alternative depending on the type and location of alternative power generation projects.

No significant consequences were identified for water system components or transmission line alternatives which would directly affect recreation resources. See the Visual Resources Technical Report for a discussion of the consequences to scenic qualities of alternative transmission corridors, particularly for their relevance to recreation opportunities for photography, sightseeing, and visiting historic places.

POSSIBLE NEW TOWN

1.0

AFFECTED ENVIRONMENT

The public lands in the region are characterized by open expanses of semiarid country surrounded on the fringes by forested mountains. Because the general region is semiarid, the unique qualities of water are suited to many recreation activities. Mountains that surround the general region are also suited to many recreation activities. The general study region has not been an area of high recreation use.

Several factors contribute to the low use figures. A relatively low area population, poor roads, general lack of surface water, few publicized recreation attractions, prohibitive land ownership patterns, lack of tourist services, and poor access to gasoline have discouraged utilization of the area's recreation potential. Table 1-10 summarizes the recreation facilities in northwestern New Mexico.

2.0

ENVIRONMENTAL CONSEQUENCES

The increase in population to this sparsely populated region would generate new recreation needs and would place additional demands on nearby recreation resources. The likely proximity to the Bisti and De-na-zin WSAs would generate noise, visual intrusions, and increased visitation, which would generate noise, visual intrusions, and increased visitation, which would significantly affect the experience of solitude in the natural, uninhabited surroundings of these resource areas. Increased population from a possible new town in the study area could affect resource sites in the Santa Fe National Forest, and recreation areas on the Jicarilla Apache Reservation, because they would be the closest resource available and accessible via route 44. An increase in ORV use in the area is likely and could affect the wilderness experience at De-na-zin and Bisti Badlands, as well as degrade the aesthetic quality of the area by introducing noise and unnatural lines (tracks) across the landscape.

Appendix

Appendix 1

AVAILABLE RESOURCE AREAS

Hunting

1. Jackson Lake Waterfowl Area
2. Nabor Ranch
3. Miller Mesa
4. Angel Peak

Winter Sports

1. Bluewater Lake
2. El Vado Lake
3. Navajo Lake

Snow Skiing

1. Purgatory Ski Area
2. Hesperus Ski Center
3. Stoner Ski Area
4. Bluemountain Ski Area

Exploring Ancient Ruins

1. Aztec Ruins
2. Chaco Canyon
3. Salmon Ruins
4. Mesa Verde
5. Simon Canyon Ruin
6. Hovenweep National Monument

Fishing

1. Animas River - 38 miles
2. Bluewater Creek - 7 miles
3. Bluewater Lake - 2350 acres
4. Butler Street Reservoir - 5 acres
5. Cutter Lake - 62 acres
6. El Paso Lakes - 6 acres
7. Jackson Lake - 60 acres
8. Lake Farmington - 198 acres
9. McGaffey Lake - 14 acres
10. Mt. Taylor Lake - 40 acres
11. Navajo Reservoir - 17,800 acres
12. Navajo River - 8 miles

13. San Juan River - 115 miles
14. El Vado Lake - 3220 acres
15. Heron Lake - 5905 acres
16. Sims Mesa -
17. Asaayi Lake
18. Berland Lake
19. Captain Tom Reservoir
20. Cutter Dam
21. Mariano Lake
22. Morgan Lake
23. Red Lake
24. Todacheene Lake
25. Battleship Rock
26. La Cueva
27. San Antonio
28. Rio Las Vacas
29. Clear Creek
30. Rio Puerco
31. Jimez Falls
32. Las Conchas
33. Paliza
34. Fenton Lake
35. Calaveras
36. Indian Head
37. Dark Canyon
38. Seven Springs

39. Los Pinos
40. Lagunitas
41. Hopewell Lake
42. El Rito
43. Canjilon Creek
44. Canjilon Lakes
45. Trout Lakes

46. Stone Lake
47. Nabor Ranch
48. Miller Mesa
49. Chusca Lake
50. San Juan River
51. Stone Lake
52. Dulce Lake
53. Mundo Lake
54. Enbom Lake
55. Glen Canyon

Water Sports

Boating

Rafting (Float-Boating)

1. Sims Mesa
2. San Juan River
3. Sand Island

Canoeing

1. Sims Mesa
2. Asaayi
3. Morgan

Motorboating

1. Jackson Lake
2. Sims Mesa
3. Asaayi
4. Chusca Lake
5. Morgan Lake
6. Red Lake
7. Glen Canyon
8. Bluewater Lake
9. El Vado Lake
10. Heron Lake
11. Navajo Lake
12. Hopewell Lake
13. Canjilon Lakes
14. Farmington Lake (Boats w/electric motors)

Sailboating

1. Jackson Lake
2. Sims Mesa
3. Asaayi
4. Glen Canyon

Houseboats

1. Navajo Lake
2. Glen Canyon

Swimming Beach

1. Bluewater Lake
2. El Vado Lake
3. Sims Mesa
4. Glen Canyon
5. Asaayi

Waterskiing

1. Bluewater Lake
2. El Vado Lake
3. Navajo Lake
4. Sims Mesa
5. Glen Canyon

Picnicking

1. Battleship
2. La Cueva
3. Redondo
4. San Antonio
5. Horseshoe Springs
6. Rio Las Vacas
7. Clear Creek
8. Rio Puerco
9. Jemez Falls
10. Las Conchas
11. Paliza
12. Fenton Lake
13. Calaveras
14. Paliza Group
15. Indian Head
16. Dark Canyon
17. Seven Springs
18. Los Pinos
19. Lagunitas
20. Hopewell Lake
21. El Rito
22. Canjilon Creek
23. Canjilon Lakes
24. Trout Lakes
25. Echo Amphitheater

26. Canyon Lobo
27. Coal Mine
28. Ojo Redondo
29. Quake Aspen
30. McGaffey

31. Morfield
32. Wetherill Mesa
33. Chapin Mesa
34. Bluewater Lake

35. El Vado Lake
36. Heron Lake
37. Navajo Lake
38. Sims Mesa

39. Chaco Canyon

40. Angel Peak

41. Asaayi Lake
42. Berland Lake
43. Captain Tom Reservoir
44. Cutter Dam

45. 4-Corners Monument
46. Mariano Lake
47. Owl Springs
48. Red Lake
49. Red Rock Junction
50. Shiprock Community Park
51. Squirrel Springs
52. Todacheene Lake
53. Tunnel Springs
54. Washington Pass
55. W. Mexican Springs

56. Red Rock
57. Jackson Lake
58. Morgan Lake
59. Farmington Lake
60. Aztec Ruins
61. Chusca Lake
62. Stone Lake
63. Dulce Lake
64. Mundo Lake
65. Enbom Lake
66. Glen Canyon
67. Hovenwood National Monument
68. Sand Island
69. Mesa Verde

Camping

1. Morfield (Mesa Verde)
2. Bluewater Lake
3. El Vado Lake
4. Heron Lake
5. Navajo Lake
6. Sims Mesa
7. Chaco Canyon
8. Angel Peak
9. Redondo
10. San Antonio
11. Horseshoe Springs
12. Rio Las Vacas
13. Clear Creek
14. Rio Puerco
15. Jemez Falls
16. Paliza
17. Fenton Lake
18. Calaveras
19. Paliza Group
20. Seven Springs

21. Los Pinos
22. Lagunitas

23. Hopewell Lake
24. El Rito
25. Canjilon Creek
26. Canjilon Lakes
27. Trout Lakes
28. Echo Amphitheater

29. Canyon Lobo
30. Coal Mine
31. Ojo Redondo
32. Quake Aspen
33. McGaffey
34. Inscription Rock
35. 4 unnamed campgrounds in Carson National Forest
36. Stone Lake

37. Asaayi Lake
38. Berland Lake
39. Captain Tom Reservoir
40. Cutter Dam

41. Mariano Lake
42. Morgan Lake
43. Shiprock Community Park
44. Todacheene Lake
45. Washington Pass
46. W. Mexican Springs

47. Red Rock
48. Nabor Ranch
49. Jackson Lake
50. Chusca Lake
51. Red Lake
52. Stone Lake
53. Dulce Lake
54. Mundo Lake
55. Enbom Lake
56. Glen Canyon (3 campgrounds)
57. Hovenweep National Monument
58. Sand Island

Appendix 2. 1992 PROJECTED RECREATION DEMAND IN USER PARTICIPATION DAYS FOR THE AFFECTED COUNTIES

Activity	Per Capita User Participation		San Juan County	McKinley County	Two County Total
Hunting Big Game	.402	Baseline	41,728	26,934	68,662
		Impact	42,973	26,994	69,967
Hunting Small Game	.499	Baseline	51,796	33,433	85,229
		Impact	53,343	33,508	86,851
Fishing	2.21	Baseline	229,398	148,070	377,468
		Impact	236,249	148,402	384,651
Boating	.646	Baseline	67,055	43,282	110,337
		Impact	69,057	43,379	112,436
Lake & River Swimming	.639	Baseline	66,328	42,813	109,141
		Impact	68,309	42,909	111,218
Camping	.651	Baseline	67,574	43,617	111,191
		Impact	69,592	43,715	113,307
Hiking	1.07	Baseline	111,066	71,690	182,756
		Impact	114,383	71,850	186,233
Picnicking	1.42	Baseline	147,396	95,140	242,536
		Impact	151,798	95,353	247,151
Birdwatching	.9	Baseline	93,420	60,300	153,720
		Impact	96,210	60,435	156,645
Backpacking	.079	Baseline	8,200	5,293	13,493
		Impact	8,445	5,305	13,750
Sightseeing	1.4	Baseline	145,320	93,800	239,120
		Impact	149,660	94,010	243,670
Visiting Historic Sites	.509	Baseline	52,834	34,103	86,937
		Impact	54,412	34,179	88,591
Photography	1.525	Baseline	158,295	102,175	260,470
		Impact	163,022	102,404	265,426
ORV	.556	Baseline	57,713	37,252	94,965
		Impact	59,436	37,335	96,771
Snowskiing	.248	Baseline	25,742	16,616	42,358
		Impact	26,511	16,653	43,164
Snow-mobiling	.019	Baseline	1,972	1,273	3,245
		Impact	2,031	1,276	3,307
Sledding	.293	Baseline	30,413	19,631	50,044
		Impact	31,322	19,675	50,997

Appendix 3. 1992 PROJECTED RECREATION DEMAND IN USER PARTICIPATION DAYS FOR THE AFFECTED COMMUNITIES

Activity	Per Capita User Participation		Farmington	Aztec	Bloomfield	Flora Vista	Lee Acres	Lower Valley	Crownpoint	Thoreau
Hunting Big Game	.402	Baseline	17,688	2,854	2,553	1,950	2,372	2,412	543	563
		Impact	18,422	2,945	2,633	2,020	2,452	2,492	563	583
Hunting Small Game	.499	Baseline	21,956	3,543	3,169	2,420	2,944	2,994	674	699
		Impact	22,867	3,668	3,268	2,507	3,044	3,094	699	724
Fishing	2.21	Baseline	97,240	15,691	14,034	10,718	13,039	13,260	2,984	3,094
		Impact	101,273	16,188	14,476	11,105	13,481	13,702	3,094	3,204
Boating	.646	Baseline	28,424	4,587	4,102	3,133	3,811	3,876	872	904
		Impact	29,603	4,732	4,231	3,246	3,941	4,005	904	937
Lake & River Swimming	.639	Baseline	29,116	4,537	4,058	3,099	3,770	3,834	863	895
		Impact	29,282	4,681	4,185	3,211	3,941	3,962	895	927
Camping	.651	Baseline	28,644	4,622	4,134	3,157	3,841	3,906	879	911
		Impact	29,832	4,681	4,264	3,271	3,971	4,036	911	944
Hiking	1.07	Baseline	47,080	7,597	6,794	5,190	6,313	6,420	1,444	1,498
		Impact	49,033	7,838	7,008	5,377	6,527	6,634	1,498	1,552
Picnicking	1.42	Baseline	62,480	10,082	9,017	6,887	8,378	8,520	1,917	1,988
		Impact	65,072	10,402	9,301	7,136	8,662	8,804	1,988	2,059
Birdwatching	.9	Baseline	39,600	6,390	5,715	4,365	5,310	5,400	1,215	1,260
		Impact	41,242	6,592	5,895	4,522	5,490	5,580	1,260	1,305
Backpacking	.079	Baseline	3,476	561	502	383	466	474	107	111
		Impact	3,620	579	517	397	482	490	111	115
Sightseeing	1.4	Baseline	61,600	9,940	8,890	6,790	8,260	8,400	1,890	1,960
		Impact	64,155	10,255	9,170	7,035	8,540	8,680	1,960	2,030
Visiting Historic Sites	.509	Baseline	22,396	3,614	3,232	2,469	3,003	3,054	687	713
		Impact	23,325	3,728	3,334	2,558	3,105	3,156	713	738
Photography	1.525	Baseline	67,100	10,828	9,684	7,396	8,998	9,150	2,059	2,135
		Impact	69,883	11,171	9,989	7,663	9,302	9,455	2,135	2,211
ORV	.556	Baseline	24,464	3,948	3,531	2,697	3,280	3,336	751	778
		Impact	25,479	4,073	3,642	2,794	3,392	3,447	778	806
Snowskiing	.248	Baseline	10,912	1,761	1,575	1,203	1,463	1,488	335	347
		Impact	11,365	1,817	1,624	1,246	1,513	1,538	347	360
Snow-mobiling	.019	Baseline	836	135	121	92	112	114	26	27
		Impact	871	139	124	95	116	118	27	28
Sledding	.293	Baseline	12,892	2,080	1,861	1,421	1,729	1,758	396	410
		Impact	13,427	2,146	1,919	1,472	1,787	1,817	410	425

GLOSSARY

Area of influence -- one day's travel distance (100-mile radius) from major communities of residence.

Participation days -- the number of days a person would participate in a specified recreation activity annually.

Short-term consequences -- lasting less than two visitor seasons.

Visitor day -- one visit to a site during a 12-hour period by an individual person (not activity-specific).

Visitor season -- a typical period within one year when visitor use is most pronounced; in New Mexico, this period is usually May-September.

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PREPARERS

BLM, New Mexico State Office

Project Manager: Leslie M. Cone

Technical Reviewer: Hugh G. Ball

Woodward-Clyde Consultants

Project Manager: Janice R. Hutton

Task Leader: Marilyn Duffey-Armstrong

CONSULTATION AND COORDINATION

- Department of Agriculture
  - Forest Service
    - Albuquerque, New Mexico
    - Taos, New Mexico

- Department of the Interior
  - Bureau of Land Management
    - New Mexico
      - State Office, Santa Fe
      - Farmington Resource Area Headquarters
    - Utah

- National Park Service
    - New Mexico
    - Colorado
    - Utah

- Jicarilla Apache Tribe

- Navajo Tribe, Parks and Recreation

- New Mexico State Parks
  - Bluewater State Park
  - Navajo Lake State Park

- New Mexico State Park and Recreation Commission

- New Mexico State Natural Resources Department

- New Mexico Department of Game and Fish

- New Mexico State Monuments